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PRESENT-DAY PROBLEMS OF PREFRONTAL LEUCOTOMY AND ITS VARIETIES.¹

By O. SCHMALZBACH,

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In order to approach the whole complex theme of prefrontal leucotomy I wish to report some facts about the prefrontal lobes, their cytoarchitecture and their connexions with the thalamus and hypothalamus, especially on the basis of research work published during recent years.

I have studied the works of Freeman and Watts of Washington, Fulton of Yale, Alfred Meyer and his associates of the Maudsley Hospital, London, Le Gros Clark of Oxford, Pool of New York, Penfield of Montreal, Spiegel and Wycis of Philadelphia, M. Minkowski of Zürich, and many others. From the clinical point of view many more publications have been written than from the anatomical side; this is understandable since the mortality in leucotomy amounts to 3% to 4% and therefore only a small number of leucotomized brains can be examined. (The number is still further diminished because of the refusal by relatives to allow post-mortem examinations to be performed.)

From clinical publications I have reviewed approximately 3800 cases. Special mention may be made of an excellent report on 300 cases by Partridge, a survey of 330 cases by Stengel, a brief summary of 1000 cases by the Board of Control in London, 331 cases by Freeman and Watts, 182 cases by Semotan of Prague, 1400 cases in which operation was performed and which were discussed by McKissock of Queen-Square, 170 cases by Mayer-Gross of Dumfries,

and a number of cases reported by various other authors. Here in Sydney Dr. G. Phillips has performed prefrontal leucotomy in about 70 cases to date during the last five years. In these series not a single death has occurred. Dr. Phillips showed a number of his patients at the British Medical Association meeting at the Royal Prince Alfred Hospital in May, 1950. He intends to publish these cases.

Since prefrontal leucotomy is based on the separation of the thalamo-frontal and fronto-thalamic fibres, I wish to draw your attention to some topographic relations.

In Figure I the well-known cytoarchitectural map of the human cortex according to Brodmann may be seen from the lateral and medial surfaces. In this figure may be noticed on the pole of the prefrontal region, area 11 and above it areas 10, 9 and 8, and area 6 which adjoins area 8. Here may also be found areas 46 and 45 which adjoin area 10. On the medial surface areas 11, 10, 9, 8 and 6 may also be followed up and also areas 32 and 24 may be seen.

About the varieties of the cytoarchitecture of the above-mentioned areas I wish to remind the reader briefly that area 11—according to Rose—belongs to *area prefrontalis* and is very similar to the *area orbitalis* (47 of Brodmann) in its structure. Area 10 of Brodmann corresponds to *area fronto-polaris*, area 9 of Brodmann to *area frontalis granularis* and area 8 to *area frontalis intermedia*.

I shall not give more particulars since in recent years the critical studies on cytoarchitectonics of Brodmann, von Economo and others have appeared, and more recently especially those by Le Gros Clark and A. Meyer. Meyer draw attention to the fact that it has not been sufficiently realized that these cytoarchitectural maps were based on the investigation of only a small number of brains. These authors were able to demonstrate the doubtful validity of some of the frontal subdivisions, and are engaged in work on the individual variability of the prefrontal areas in the human brain.

¹ Based on a paper read at a meeting of the Neurological Group of the University of Sydney, New Medical School, on December 9, 1950.

The relation between the separate areas of frontal lobe is given in a sketch by Mettler, seen in Figure II. Here it is of interest to note the proportional thickness of the layers in these areas.

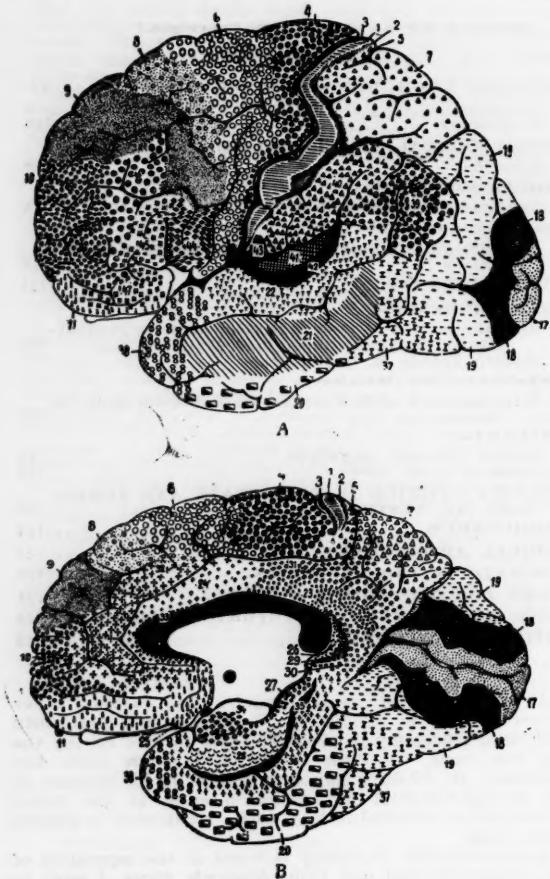


FIGURE I.
Areas of the human cerebral cortex, each of which possesses a distinctive structure. A = lateral view, B = medial view.
(After Brodmann.)

Anatomical Connexions.

The frontal areas and orbital surface of the frontal lobes project to three primary subcortical centres: (a) the anterior nuclei of the thalamus, (b) the dorso-medial nuclei of the thalamus, and (c) certain of the hypothalamic nuclei. Recently this was stated by Le Gros Clark, Glees, Meyer and Rose and Woolsey (see Figure III).

Rose and Woolsey suggested a subdivision of the frontal lobes on the basis of their thalamic projections, and the frontal areas connected with the dorso-medial nucleus should be regarded as a functional unit. The dorso-medial nucleus, according to Le Gros Clark and Fulton, may be looked upon as a primary relay station between the frontal lobes and the hypothalamus and as establishing functional connexion between the frontal cortex and subcortical nuclei.

Murphy and Gellhorn found connexion between the different parts of the hypothalamus and the dorso-medial nuclei through physiological neuronography. At the same time the studies of McCulloch and Ward showed the existence of direct projections from frontal lobe to hypothalamus.

Intercortical Connexions of the Frontal Lobes.

Data of intercortical connexions of the frontal lobes are still incomplete. One of the long association tracts which exists in the cerebral hemisphere has its origin in

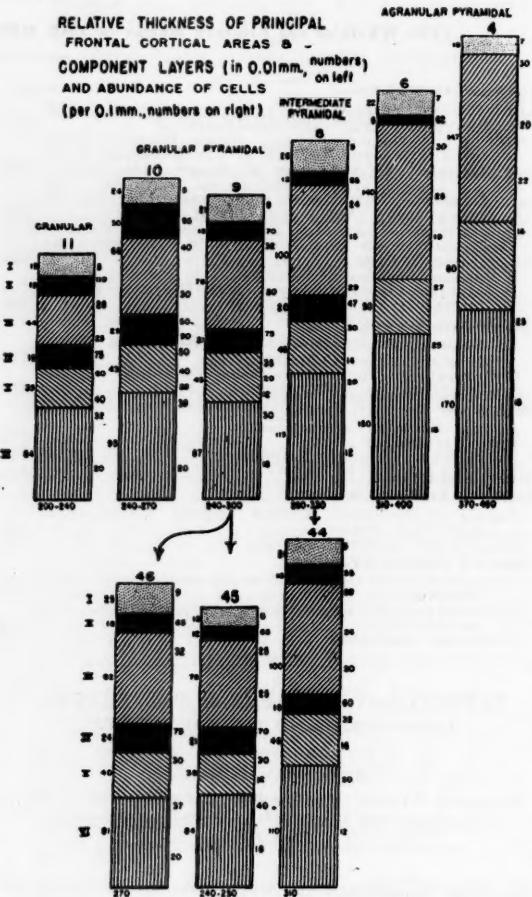


FIGURE II.

Diagram of relative thickness of principal frontal cortical areas and their component layers (given in 0.01 millimetre, numbers to left of each block) computed at summit of gyri, and average number of cells per 0.1 millimetre of each layer (numbers along right of each block). The appearance of several numbers by any given block indicates that the layer is subdivided and that its subdivisions contain the number of cells indicated. (These figures are from Economo and Koskinas and cannot be used for tissue from living humans.) It will be observed that the transition from area 4 through 11 is in the direction of progressively thinner cortex and greater granular development. Areas 44 to 46 are profitably regarded as ventral parallels of this plan beginning with 44, which has much in common with 8, and progressing through 45 and 46 which resemble 9. With regard to areas 44, 45 and 46 it will be observed that in the last the pyramidal layer is undivided, in area 45 it is double, and in 44 it is triple. (Taken from Mettler's book "Selective Partial Ablations of the Frontal Cortex".)

area 8 of the frontal lobe and extends directly to the parastriate area (18 and 19 of Brodmann) of the visual cortex of the occipital lobe. This fasciculus is seen in Figure IV (re-drawn from Le Gros Clark).

Another efferent association tract from the frontal lobe takes origin—as seen in Figure IV—from area 47 and leads downwards and backwards to the pole of the temporal lobe. In his studies of leucotomized brains Meyer reported degeneration in this fasciculus.

On the projection of the thalamus on the frontal lobe and on the association fibres of the thalamus and the hemispheres, mention should also be made of the interesting experimental work of M. Minkowski (Zürich) and Walker (Maryland). These studies were reported by Minkowski at the International Neurological Conference in Paris in September, 1949.

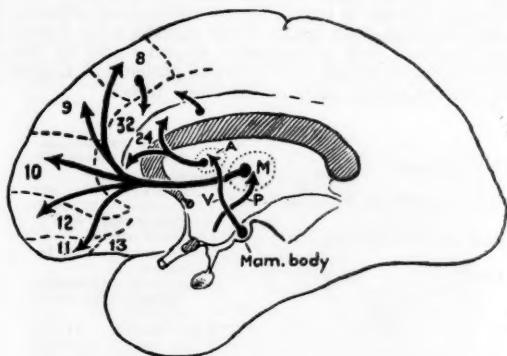


FIGURE IIIA.

Right cerebral hemisphere from medial aspect showing main afferent connexions of the frontal lobe. Only those paths which are firmly established are indicated. A, anterior nucleus of thalamus; M, dorso-medial nucleus; P, periventricular system extending from hypothalamus to dorsomedial nucleus; V, mammillo-thalamic tract (bundle of Vicq D'Azyr). Numerical designations are those of the Brodmann cyto-architectural map as modified by Walker for the orbital surface. (From Le Gros Clark, 1948.)

The Clinical Results.

In recent years there have developed several varieties of prefrontal leucotomy, such as (a) topectomy, (b) selective cortical undercutting, (c) transorbital leucotomy, and (d) thalamotomy. Details of these varieties I shall discuss later on.

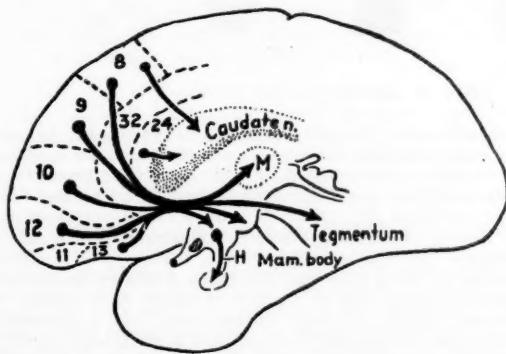


FIGURE IIIB.

Right cerebral hemisphere from medial aspect showing main efferent connexions of the frontal lobe. M, dorsomedial nucleus; H, supraopticohypophyseal system innervating the posterior lobe of the pituitary. Numerical designations as in Figure IIIA. (From Le Gros Clark, 1948.)

Of all the clinical publications already mentioned attention will first be directed to that by Partridge, since it is the most explanatory. I have prepared several tables and sketches on the basis of this work, which will give a picture of his 300 cases. Partridge's patients were operated on with the same technique and by one neurosurgeon (McKissock). Partridge followed up his patients during a period from half to three years and he travelled

about 60,000 miles so as to see each of the 300 patients personally, six months, one year and two years after operation.

In Table I the cases are grouped according to diagnosis. There were—as can be seen from this table—85 patients with affective disorders including sub-groups, 159 schizophrenics of various types, 29 obsessional patients, eight

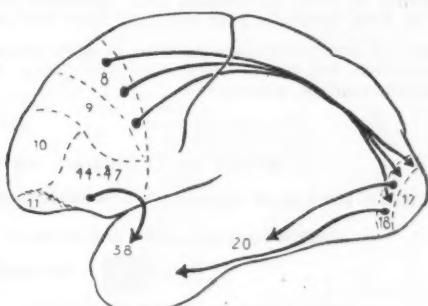


FIGURE IV.

Left cerebral hemisphere from lateral aspect, showing long association tracts through which impulses from frontal lobe are transmitted back to cortex of occipital region and temporal lobe. (After Le Gros Clark.)

with psychopathic personalities, five patients suffering from drug addiction, seven mental defectives and seven whose illness was associated with organic disease.

Complications and Sequelae.

Complications and sequelae in this series of 300 cases may be seen in Table II. There were 23 deaths, of which

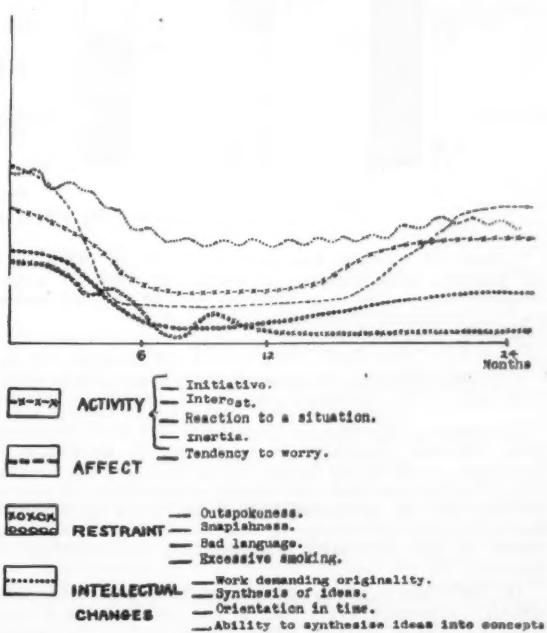


FIGURE V.

Showing post-operative personality changes at the psychic level. (Patients recovered from an affective disorder.)

four were unrelated to the operation. Of the remaining 19, 10 deaths were due directly to the operation or to post-operative epilepsy. In Partridge's cases, therefore, the

operative mortality was 4% and the mortality among the physically fit patients was under 3%.

After the operation 10% of the 300 patients developed epilepsy. Ten of these 30 patients had a single fit on one occasion only, 20 (6.7%) had fits on more than one occasion.

Slight urinary incontinence—as seen in the same Table II—was found in 7.6% six months after operation and was present in 4.6% after one year and 3.2% after two years.

Urgency of micturition was present in 66% six months after operation, but in only 15% after two years. It was twice as common in women.

to a situation and inertia. There was a general trend for activity to return to normal.

In the affective field the deficits were seen in a diminished tendency to worry. Here, too, a trend to return to normal could be seen.

Deficits in restraint were noticed in various ways. Of 60 patients, 33 showed outspokenness at six months after operation; 32 of them showed snappishness in a fashion previously foreign to them. Eleven patients not accustomed to bad language were using it six months after operation. Seven patients took to excessive smoking and 15 became unrestrained in eating. However, 31 patients of this group were less unselfish than before their illness.

EFFECT OF LEUCOTOMY ON PARTICULAR SYMPTOMS

Calculation based on all instances of the particular symptoms which were available for study (see text)

Result shown as percentage of total instances of each symptom which after operation were

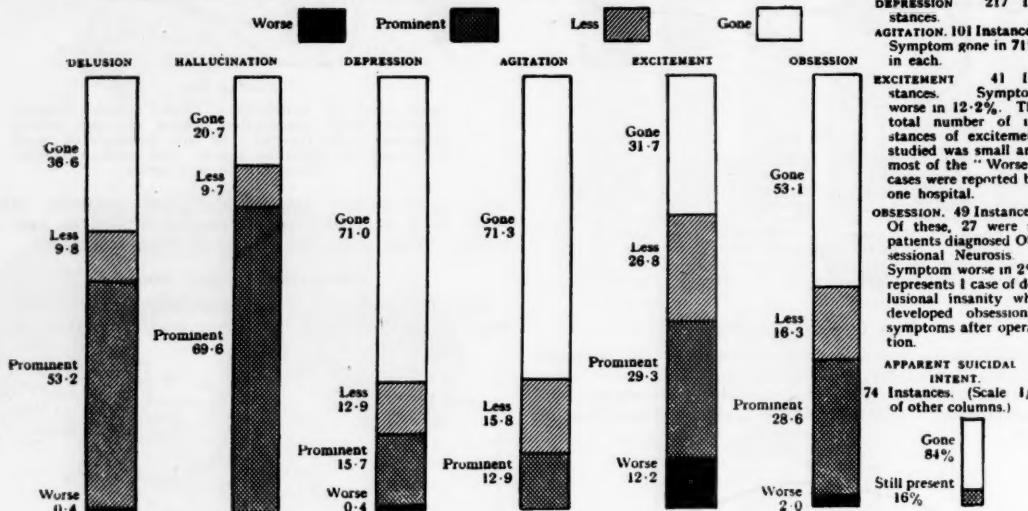


FIGURE VI.

Taken from publication by Board of Control.

Increase of appetite was shown in 80% of cases after six months, and increase of weight in 90% of cases, ranging from a few to a hundred pounds and not necessarily attributable to excessive eating.

Sleep was restored in 90% of cases.

Post-Operative Personality (*Changes at the Psychic Level*).

In regard to the changes in patients who have recovered from affective disorders, it is necessary, according to Partridge, to use recovered and discharged patients, because "it is well-known that the neutral atmosphere of mental hospital life, its protection against the world and its mild but supportive discipline, is one against which the true extent of the personality changes may be impossible to discern".

In Partridge's group of 60 patients recovered from affective disorders, every patient had deficits of some sort—in the field of activity, affect and restraint. Particulars about the deficit in these fields are shown in Figure V.

Deficits common to all patients (the pre-morbid and post-operative personalities being compared) were reduction in activity, general reduction in affect and restraint, and intellectual deficits.

Deficits in activity were observed in lack of, or diminished, initiative, reduced interest in and/or reaction

Intellectual Changes.—The view advanced by some psychologists that intelligence is unaffected by prefrontal leucotomy is not accepted by Partridge. It appears to him that tests used at present are not sufficiently refined. However, no tests were carried out in these series of cases to reveal intellectual deficits following prefrontal leucotomy. It was concluded that there were intellectual deficits in more than half the cases, a finding based on the patients' behaviour in the life situation as a whole. The deficits consist (as seen on the graph) of a tendency to less ready orientation in time, and a diminished ability to synthesize ideas into concepts, of difficulty in holding several items in mind at the same time and a diminished ability for work demanding originality. "The patients tend intellectually to be more empty, with restricted interests and simpler satisfactions."

The Post-Operative Personality under Conditions of Normal Work.—Of 60 patients recovered from affective disorders, 13 returned to their previous jobs, four took jobs but maintained them below their previous level, 12 were retired and looked after themselves, 25 were housewives of whom 18 returned to their previous work, three did not work post-operatively and one took a job for the first time. There was some suggestion that those patients in the more skilled occupations had more difficulties in resuming their work.

Results in Schizophrenic Cases after Prefrontal Leucotomy.

Results in this group of Partridge's cases are shown in the next table (Table III).

In this group were 158 cases. Of those, 77 were incontestably schizophrenic, 35 schizophrenic with affective colouring, 19 recurrent schizophrenic, eight paranoid schizophrenic, and 20 other schizophrenic cases. Since the results are clear from the table I wish to draw attention to only a few points. In this group of 158 patients, seven became worse and the condition of 22 was not improved compared with 36 recovered and discharged from hospital and four more recovered after relapse. In the group still in hospital, 10 were much improved and 36 showed

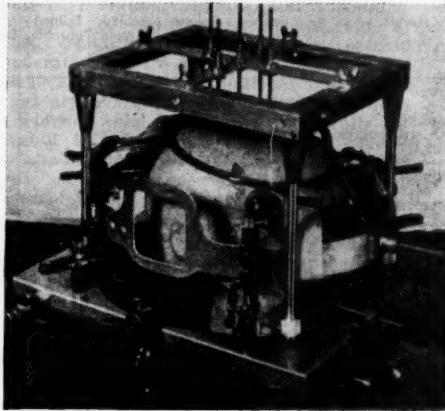


FIGURE VII.

Showing base of stereotaxic apparatus with superstructure containing five pins for the checking of proper positions. (After Spiegel and Wycis.)

improved conduct. In the discharged group 31 patients showed sustained recovery.

The incidence of post-operative epilepsy was approximately 10% and was present on more than one occasion in 6.7% some months after operation. In the schizophrenic group the occurrence of post-operative epilepsy seems to be higher in men than in women.

Obsessional Cases.

There were 29 obsessional cases; of these, eight were obsessive, compulsive, ruminant and 15 were ritualistic. In this group of obsessional cases no patient was worse after operation except one who died as a result of the operation. All survivors, discharged from hospital, did not need medical attention for two years. Six patients in this group lost their symptoms entirely and eight showed varying degrees of improvement, while the condition of one remained unchanged. In general it may be said that the more the rituals were varied in form and in frequency, the better the prognosis for treatment by operation. The residua after operation were no longer regarded as symptoms by the patients or by their relatives. In this connexion I recall the case of a woman with obsessional ritual symptoms who washed her hands approximately 160 times a day. She was under treatment by Alfred Adler himself and by pupils of Freud for one year in Vienna. After the treatment, according to her psychotherapists and relatives she was "markedly improved"—she washed her hands only "about 90 times daily". In this case, however, prefrontal leucotomy was not performed (being before the era of prefrontal leucotomy), but it shows that the residua should be taken into consideration, especially in obsessional cases.

Patients with Affective Disorders.

There were 85 patients with affective disorders, of whom two were regarded as suffering from recurrent mania without depressive attacks, 16 had shown both mania and

depression, 29 had recurrent depression without mania, 33 suffered from a single depressive illness and of these 21 were considered to be suffering from involutional melancholia. On the whole in this group there were 27 patients who recovered and were discharged to their homes (most of them belonged to the group of depression without mania).

TABLE I.

Group of Patients.	Condition.	Number of Cases.	Total.
Patients with affective disorders.			
	Mania	2	
	Manic depressive group	16	
	Depression without mania	29	
	Single depression illness (involutional melancholia)	...	
		38 (21)	
Schizophrenics . . .			
	Incontestably schizophrenic	77	
	With affective colouring	35	
	Recurrent schizophrenia	19	
	Preserved paranoid . . .	8	
	Other cases . . .	20	
Patients with obsessions			
	Obsessive compulsive ruminant	8	
	Manic depressive admixture	2	
	Schizophrenic admixture	2	
	Obsession with severe depression	2	
	Ritualistic cases . . .	15	
Psychopathic personality			
	Inadequate psychopath	3	
	Aggressive psychopath	2	
	Schizophrenic psychopath	2	
	Additional . . .	1	
Drug addicts . . .			
	Addicted to paraldehyde	1	
	Addicted to paraldehyde and alcohol . . .	1	
	Chronic alcoholic . . .	2	
	Morphine, heroin or cocaine . . .	1	
Mental defectives . . .			
	Idiot . . .	1	
	Recurrently schizophrenic defective	2	
	With mild schizophrenic features . . .	1	
	With depressive features . . .	2	
Patients with disorders associated with organic disease.			
	Intractable pain . . .	1	
	Post-encephalitic sequelae . . .	1	
	Head injury with paranoid schizophrenic state . . .	1	
	Intracongenital birth injury . . .	1	
	Presenile dementia . . .	3	
Total . . .	...	300	

In these patients with affective disorders some correlation exists between the duration of illness and recovery. In general the chances of recovery are reduced, according to Partridge, when the illness has lasted more than three years without remission.

Psychopathic Personalities.

Of eight patients in this group, one died after a few days of coma which developed six weeks after operation. There were three inadequate psychopaths of whom one was much improved and two were slightly improved. Of two aggressive psychopaths, one developed epilepsy for the first time after operation but was easier to manage while in hospital, whilst the second developed schizophrenia after operation. Of two schizoid psychopaths, one was much improved and the other showed considerable improvement.

Drug Addiction.

Among the patients with drug addiction there were five women, all of whom were psychopathic. One was addicted to paraldehyde, one to paraldehyde and alcohol, two were chronic alcoholics and one was addicted to morphine or its

substitutes. Three of five in this group were worse after operation, the remaining two were relieved of their addiction and have remained so for more than two years.

Patients with Disorders Associated with Organic Disease.

There was improvement in a patient with intractable pain and in another with post-encephalitic symptoms. In another few cases of this group marked and temporary improvement occurred.

TABLE II.
Complications and Sequela in 300 Cases.

Sequel or Complication.	Type.	Incidence.	Total.
Death	Due directly to operation	10	23 ¹
	Some months after operation	2	
	Influenced by operation	4	
	Moot point (?)	3	
	Unrelated to operation	4	
Post-operative epilepsy	Epilepsy for the first time	30 (10%)	10%
	Fits on more than one occasion	20 (6.7%)	
Slight urinary incontinence.	Present after six months	7.6%	
	Present after one year	4.6%	
	Present after two years	3.2%	
Urgency of micturition	After six months	66%	
	After one year	28%	
	After two years	15%	
Increase of appetite	After six months	80%	80%
	After one year	40%	
Increase of weight	After six months	90%	90%
	After six months	90%	

¹ The total 23 includes four deaths unrelated to operation and four cases in which the relationship to operation was a moot point.

Mentally Defective Group.

Among seven cases of this group great improvement was obtained in one case, that of a defective with schizophrenic features, and in a second in which the patient manifested depressive features. The total outcome was beneficial in all those seven cases.

After this review of 300 cases which have been worked up by Partridge, I wish to draw your attention to the results of leucotomy in 1000 cases, based on a publication by the Board of Control (England and Wales).

In this summary of 1000 cases death occurred in 6%. Half of these deaths were attributed to the operation. In 19 of these 30 cases the cause of death was haemorrhage. Of the 1000 patients 35.3% were discharged, and of those discharged 24.8% had recovered and 10.5% manifested improvement. In this discharge group 9.3% of patients relapsed; 1% of the patients were worse after operation. Remaining in hospital in an unchanged condition were 24.8%; 32.3% were improved but still in hospital. Post-operative epilepsy occurred in 3.3% of cases and in 2.1% on more than one occasion.

The effect of leucotomy on particular symptoms in this group of 1000 cases may be seen in Figure VI (redrawn from the above-mentioned publication).

The schizophrenic group formed 60% of the total treated and in this group the discharge rate was 23%. The manic depressive group formed 25% of cases with a discharge rate of 50%.

I intended also to produce data from other clinical publications, but since I do not wish to tire you with statistical figures and also because these figures about clinical results are more or less similar with different authors, I should like to mention only in short the summary of 330 cases, published by Stengel in July, 1950. These patients were operated on by A. G. Rose; the technique was similar to that of the standard method of Freeman

and Watts. In this material epileptic fits occurred in a higher percentage of male than of female patients. At the same time more schizophrenic and paranoid patients had epileptic fits than patients with affective disorders.

The results attained in these series of 330 cases are similar, as already mentioned before, to those described by other authors. Stengel is critical of the improvement noted in his series; he writes: "Whether the remissions obtained by leucotomy are of better quality and durability than spontaneous remissions or those following other

TABLE III.
Schizophrenic Cases.

Result.	Un-doubted Schizophr. 77 Cases.	With Affective Colour-ing. 35 Cases.	Re-current Schizophr. 19 Cases.	Paranoid Schizophr. 8 Cases.	Other Types. 20 Cases.
<i>Death:</i>					
At operation	3	0	0	0	0
Delayed—attributable to operation	2	2	0	0	1
<i>Still in hospital:</i>					
Worse	3	1	1	2	0
Not improved	15	4	1	2	0
Conduct improved	23	9	4	0	0
Markedly improved	5	5	0	0	0
Improved to home level	2	0	0	1	1
<i>Discharged from hospital:</i>					
Discharged against advice	6	0	0	0	0
Discharged though psychotropic	8	2	3	2	1
Discharged, psychotic relapse	1	1	0	0	0
Discharged with psychotic traces	7	4	1	0	4
Discharged with psychotic traces and relapsed	2	0	0	0	0
Discharged and recovered	5	10	8	1	12
Discharged recovered, but relapsed	1	1	4	1	0
Recovered after relapse	0	1	3	0	0
Sustained recovery	6	9	4	0	12

methods of treatment, it is impossible to judge at present." However, basing his view on the fact that leucotomy was followed by immediate or almost immediate improvement, Stengel concludes that the remission was in his series of cases related to the operation.

Varieties of Prefrontal Leucotomy.

Before going on to discuss details of topectomy, selective cortical undercutting, transorbital leucotomy and thalamotomy, I should like to give you some opinions about the improvements in leucotomy and its varieties.

F. Mettler, in a critical survey of the various forms of psychosurgery, has expressed the view that for the time being it is not clear how many patients subjected to leucotomy would have manifested improvement without it, the more so since the condition of patients has improved after electro-convulsive therapy or insulin coma, and since spontaneous improvement also occurs. He recommends: "In any event no cases should be subjected to psychosurgery unless (i) a complete recent and energetic restudy of the case has been made by a competent psychiatrist, and (ii) all available, promising, less drastic therapeutic methods have been exhausted, in line with the old law, *primum non nocere*."

Less extreme, if also critical, are most of the authors who, like Partridge, believe that the patient may get better or worse in spite of the operation.

Topectomy.

The modification of pre-frontal leucotomy known as topectomy was introduced by L. Pool. Here the areas 9 and 10 are removed. The quantity of tissue removed is extremely important in the opinion of Pool and varies in different mental illnesses. For instance, in chronic schizophrenics Pool states that if improvement should take place

a larger amount of tissue has to be removed than in the affective disorders or in cases in which intractable pain is present. He removed 30 to 35 grammes from each side from schizophrenic patients, 20 to 25 grammes from those with compulsive or depressive states and approximately 15 to 20 grammes from those with pain. In 125 cases Pool reported that he found a greater percentage of post-operative epilepsy (compared with other methods), but the operative mortality was zero.

Electro-encephalography (EEG) gave normal tracings in all patients before operation, but after the operation changes were found in the prefrontal and precentral areas for a period of four to six weeks. The anatomical examinations in these cases were carried out by Mettler. Abnormalities of the cortex (seen at the operation) were present, particularly in about 50% of the schizophrenic patients. These changes are characterized by cortical atrophy with widened sulci and narrow gyri while the arachnoid is thickened. Microscopic studies have shown no abnormalities, so that the macroscopic changes seen during the operation are unexplained.

Selective Cortical Undercutting.

Selective cortical undercutting introduced by Scoville of Yale University was performed by Scoville in the treatment of 124 patients up till September, 1949. Like topectomy this operation is also not a "blind" one. Follow-up studies were from one to ten months after the operation. There were 96 schizophrenics, six psychoneurotics, 17 patients with affective disorders and five with intractable pain. In this group of Scoville's cases there were two deaths, four post-operative haemorrhages and no infections. Ten per centum of patients have shown post-operative epilepsy. The percentage of cases in which improvement occurred was similar to that following other forms of leucotomy. (Details about the technique may be found in publications of this author.)

Transorbital Leucotomy (the Deep Frontal Cut).

Transorbital leucotomy was introduced by Fiamberi, and was applied extensively by Freeman and Watts. From the technical point of view this does not appear to be the best method of section of all the fibres from the frontal cortex, as claimed by Freeman and Watts. Before the operation

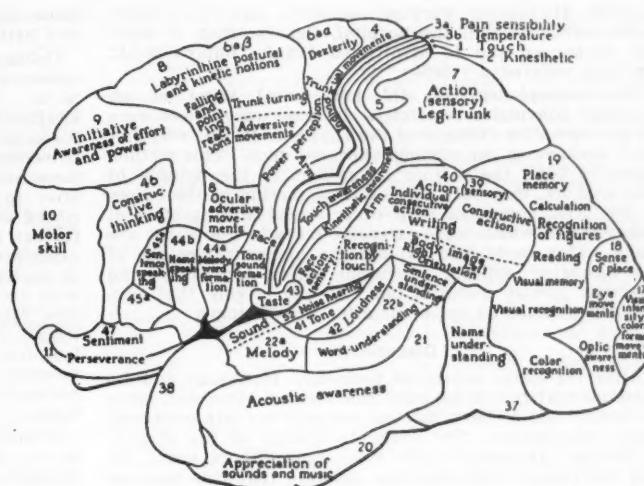


FIGURE VIII.

Showing Kleist's localization of function according to the architechtural field. Lateral aspects of cerebral hemisphere. (Reproduced from Freeman and Watts.)

the patient is put into a state of coma by two to five electroconvulsive shocks successively.

Up to September, 1949, 350 patients had been operated on by this method by Freeman and Watts with only two fatal haemorrhages and two deaths from other causes. Within a day or two after the operation the patient is usually discharged and sent home, but many of these authors' patients were operated on early in the disease. It is emphasized by Freeman and Watts that this method is simple and safe. It is useful in cases of the chronic schizophrenic reaction type, in involitional and obsessive psychosis and in cases of severe chronic pain of neoplasm origin.

Thalamotomy.

Thalamotomy, introduced by Spiegel and Wycis of Philadelphia, leaves the association system between the frontal lobe and the other parts of the cortex intact and by placing small lesions in the dorso-medial nucleus of the thalamus interrupts the connexion between this nucleus and the frontal lobe. The association systems are not affected by this operation. Lesions may be made either by electrolysis and use of the direct current, or by electrocoagulation with the high frequency current. The apparatus which Spiegel and Wycis are using is a modification of the stereotaxic method of Horsley and Clarke and is called the stereotaxic apparatus. This apparatus consists of two parts, superstructure and base, and may be seen in Figure VII.

Thalamotomy was performed by these authors on 41 patients (there being altogether 59 operations). Most of these patients were under treatment before the operation for a period of one to seventeen years and had various forms of shock therapy without relief. In this series the death rate was 3.4%.

Post-operative symptoms after thalamotomy were similar to those after pre-frontal leucotomy: somnolence, disorientation and memory defects, apathy and inertia. These symptoms may be noted in the first few days after operation. In cases in which operation was successful, according to Spiegel and Wycis, the patients' anxiety, worry and tension were reduced or disappeared, and the patients were more easily manageable. Of 33 patients in this group, five returned home with nearly full and

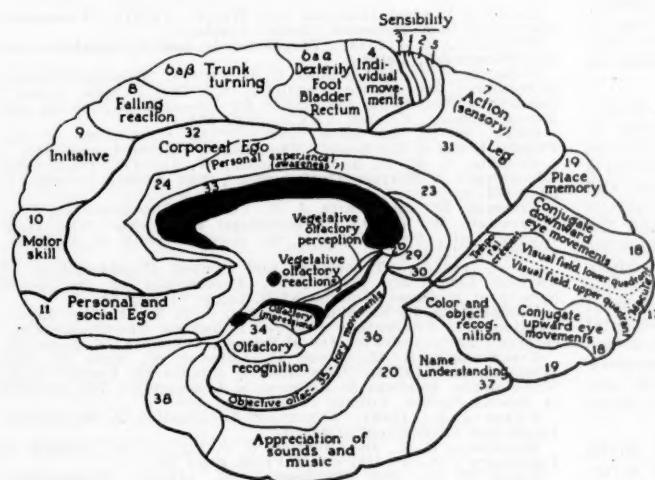


FIGURE IX.

Showing Kleist's localization of function according to the architechtural field. Medial aspect of cerebral hemisphere. (Reproduced from Freeman and Watts.)

11 with diminished working capacity, nine were more easily manageable in the hospital, the condition of eight was unchanged and 16 manifested definite improvement; six have suffered a relapse.

Electroencephalograms did not reveal signs of an increased convulsive reactivity. In many cases there were no post-operative changes of the rhythm. In this series of cases Jacksonian convulsions appeared once. This method seems to have the further advantage, in the opinion of both authors, that only a minimum scarring of the cortex is produced, compared with other varieties of prefrontal leucotomy in which more extensive scars in the cortex are made. This could also explain the higher percentage of post-operative epilepsy occurring after *topectomy* and selective partial undercutting. It also seems that personality changes do not occur after thalamotomy.

Discussion.

After the above survey of prefrontal leucotomy and its varieties I wish to draw some conclusions. However, since no finality has yet been reached, one may not talk positively about conclusions. The complete history of the surgery of mental disorders is not more than fifteen years old and the present investigations indicate that this form of treatment, as pointed out by Moore and his associates (Connecticut), has passed "its infantile and early childhood periods to one of adolescent and experimental exploration".

I have to confess, after having studied the literature and with our own modest experience, that one cannot help but feel a predominant confusion. According to the majority of authors this operation must be the treatment of the last resort. The decision for the operation, however, should not be delayed. Partridge suggests a limit in the schizophrenic cases of five years from the onset, and in affective disorders the operation should be performed not later than approximately three years after the onset of the illness. Prefrontal leucotomy and its varieties should be performed in properly selected cases in which other methods of treatment have failed.

Thus, where scientific facts end speculation starts; but again, without speculation no scientific progress is possible. I do not want to produce here all those hypotheses which have been made in explanation of the effect of prefrontal leucotomy on mental illnesses. How far these unfounded speculations can go is shown in Figures VIII and IX; they are taken from Kleist and show the localization of various functions of the personality according to the architectonic fields. Freeman and Watts think that without the frontal lobe there would be no functional psychosis. Kallinowsky, on the other hand, believes that psychotic syndromes in the major psychoses do not originate in the frontal lobe and in his opinion there is no specificity of function in special areas of the frontal cortex.

For illustration a remarkable case report of A. Meyer, published in 1945, may be cited. This was a case of schizophrenia in which prefrontal leucotomy was performed after five years of illness. The operation was considered a success. The patient became "unworried and happy and it was a pleasure to see him". The patient died eighteen months later from carcinoma of the oesophagus and the post-mortem examination showed that the fronto-thalamic fibres were not severed and degeneration of the dorso-medial nucleus had not occurred. This case is an example of the difficulties of explaining the results of prefrontal leucotomy. Nevertheless, section of the thalamo-frontal fibres and degeneration of the dorso-medial nucleus are related to the post-operative results of the mental disorders. The anatomical findings show particularly that the pre-frontal cortex, thalamus and hypothalamus form a functional and coordinated unit.

It is of interest that Pickworth of Birmingham found that the brains of schizophrenics were often better structurally than those of non-mental persons. He points out the importance of structural lesions of the cerebral blood vessels of the cortex. It is difficult to think that the pathological changes of schizophrenia are not more diffused,

since according to Henderson and Gillespie, schizophrenia is a partly inborn and partly acquired illness.

Goldstein interprets behaviour as a function of the total substrate of the nervous system rather than of its isolated parts. We, therefore, see that the old battle about the localization principle is not forgotten in the prefrontal leucotomy discussions. I believe that research teamwork is necessary in order to solve these problems, especially those associated with experimental examination of animals after partial ablation of the special areas in the frontal cortex and of its parts. Of importance seem also to be further anatomical examinations in psychiatric and non-psychiatric conditions and investigations about the role of the hypothalamus in mental disease. I am now engaged with Dr. Peter Bishop in the Brain Research Unit of the New Medical School in work connected with these problems. This work will take at least two years. If leucotomy is not to remain a shot in the dark or "a measure of desperation", as it is called by Freeman, research of this kind will have to be extended on a broader basis.

Finally, I wish to underline a point which appears to be of general importance. Our endeavours should be directed not only towards treatment of mental disorders but also to its prophylaxis. It is remarkable how small a place this question has in psychiatric research. In 1948, in a publication, I expressed my view about this question when I wrote about bioprophylaxis.

As a general conclusion we can say that a large number of patients may benefit from prefrontal leucotomy and its varieties if they are properly selected and if other methods of treatment have failed. This is also an economic advantage, that its adoption will help to relieve overcrowding in mental hospitals.

Acknowledgements.

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DIARY OF A MEDICAL PARSON: BEING EXTRACTS
FROM THE DIARIES AND LETTERS OF THE
REVEREND B. G. WILSON (1823-1878).

By H. STUART PATTERSON,
Ipswich, Queensland.

"Monday, 17th May, 1858: Left Bradford this morning by the 9-25 train and travelled with my own wife and our two children first class to Liverpool. I am setting out in a delicate state of health to journey to the end of the Earth, God help me to do and suffer His Holy Will."

So commences the diary of my great-grandfather, the Reverend Benjamin Gilmore Wilson, whose large frame, huge black beard, powerful Irish voice and hearty laugh were soon to become well known to the Brisbane of the sixties and the seventies of last century.

Brisbane in those days was a friendly little town. Sir George Ferguson Bowen was Governor of Queensland from 1859 to 1867, and "Governor" Bowen, as he rode along what later became Gregory Terrace, would stop when he saw Great-grandfather in his garden and chat with him over the front fence. He was doubtless surprised and perhaps a little amused at the interest the parson took in things outside his own congregation. For Great-grandfather was interested in everything and everybody, whether it was the establishment of the Brisbane Grammar Schools, the arranging of a deputation to wait on a minister of the Crown, or merely attempts to keep the Sandgate beach free of sharks.

Benjamin Gilmore Wilson was born on March 16, 1823, at Moy, County Tyrone, Ireland. His father, a farmer, was a Quaker; his mother, a devout woman, was a Primitive Wesleyan. Those were grim times of famine and want in Ireland and, in a letter written from Brisbane in 1862, to a sister in Canada, Great-grandfather says: "Happy, happy would it have been for us all if years before those dark, dark days of our trouble we had sold out our two farms and come to this country. Here we could not have failed."

His brothers and sisters emigrated to Canada in the 1830's, and a few years later he himself went to England to take up "a mercantile appointment". Ever since boy-

hood, however, he had been filled with missionary zeal and had been accustomed to gathering together the farm servants and neighbours and conducting religious services amongst them.

In Bradford, where he now was, he found an outlet for this zeal, helping to found the Young Men's Christian Association in that city and being appointed city missionary. At the same time he began the study of medicine with Dr. J. LeGay Brereton, a homeopathic practitioner of medicine, who conducted a large practice in Bradford at that time and who was later to come out to Sydney and practise medicine there.

While in Bradford he one day happened to hear a sermon on baptism. Deeply shocked, he followed the preacher to Manchester to point out to him the error of his ways. Instead he was convinced of his own error and straightaway applied for baptism.

Subsequently he travelled on the Continent, and his diary, which we still have, is as legible today as it was when written nearly one hundred years ago. It records that he visited Zurich, Lucerne, Basle, Worms, Boom and Rotterdam. While abroad he was offered and declined the pastorate of an English church in Belgium. Soon afterwards he accepted a call to a church in Barnsley, Yorkshire, and married, in 1854, Mary Jane Matchett, of the city of Armagh, a staunch member of the Church of England. Her missionary brother, hearing of her marriage to the Baptist parson, wrote home from Karachi: "I hope he will not convert Mary Jane." Great-grandfather's retort, on hearing this, was: "If I had thought Mary Jane needed 'converting' I would never have married her!"

Soon after his marriage Great-grandfather once more returned to Bradford "to perfect myself in medical practice" under Dr. Brereton. (This was in the days before the passing of the *Medical Act* of 1858, when the apprenticeship system was still in vogue.)

His intention was now clear: to equip himself to be a medical missionary. And when in 1858 he saw a letter in the London *Freeman* calling for a clergyman to take charge of the first Baptist church in Queensland he made up his mind. Giving up what was now a lucrative practice in Bradford (he was said to be receiving £1200 a year), he volunteered to come to Queensland at a salary of £200 per year. He was accepted from amongst a number of candidates and sailed from Liverpool in 1858. It is here the diary of the voyage begins.

May 20th, 1858: This day with my wife and two children on board *The Tornado*, Captain Robert Creighton, Commander, sailed out of the port of Liverpool for Melbourne. We have two Presbyterian ministers with their wives with three other passengers for Saloon companions. The rest of the passengers and crew do not amount to more than two hundred persons. Before lifting our anchors we met together between decks for prayer to invoke the blessing of God to accompany us on our voyage. The same pilot takes us out of the River that took out the good Livingstone. We were towed out of the Mersey and the wind, after we got out a little, sprang up dead ahead and blew so strong that, despite the efforts of the tug-boat, we were making our way back to Liverpool.

Friday, 21st May: The wind is still stronger and ahead. The passengers very sick, among the rest my dear wife.

Saturday, 22nd May: The wind still ahead. This morning we part with our tug-boat, which has done us no good, the wind having blown us several miles back. One of the owners of the vessel being with us returned on the tug-boat. The Providence of God is working against this man, who appears to be very selfish. I heard him give instructions to the purser outside my cabin-door that has made me feel as if every passenger on board was looked upon by him as something out of which he could make as much as possible. 'Be civil and courteous', said he to the purser, 'but keep back all you can.'

Sunday, 23rd May: Our first Lord's Day at sea, we were all so sick that no one could undertake to hold a service on board. I could have done so but the people were too sick to listen to me. I have been sickly all the way but not so ill as to vomit, which I have tried all I could

to avoid, that I might be able to attend to my wife and our children, which I have done this far. Evening: The wind has veered round in our favour and we are sailing very fast on our course to Melbourne.

Monday, 24th May: The wind continues fair and our ship goes beautifully. Today we see a porpoise.

Tuesday, 25th May: Scarletina has broken out in the ship. The Captain has related the symptoms of the disease in a child to me, whose death I feel certain of. Our Doctor is a very feeble old man and very ill-provided with medicines. I understand he has been employed, and his chest provided for him by — — and Co. They have fallen very much in my estimation since I have learned this with other not very creditable matters from reliable sources.

Wednesday, 26th May: The child died this morning. At the request of the Captain I officiated at the funeral service. I read the 107th Psalm. Most of the passengers and crew stood around me uncovered. After reading the Psalm I deliver a short address, my strength being greatly improved. At the close of the address I pray, after which advancing to the side of the ship and giving time to the sailors to arrange the dead body, which they do by tying a stone to it and placing it upon a board. Then using words somewhat similar to those in the service of the Church of England for the service-at-sea, the body was thrown into the deep, the Benediction pronounced, and I retire with the Captain fatigued to his cabin. This first funeral service at sea affects me but I have been pleased to see the most noted attention given to what was said.

Thursday, 27th May: The wind this morning is favourable and we are sailing in our course. Several of the passengers have fallen sick and applied to me for advice and medicine. One, the little brother of the child we buried yesterday, has taken ill of something very like scarlatina. He is feverish and sick with a sore throat. I have given aconite and belladonna for him and his poor mother. I am not a little concerned. Several of the other passengers are ill but will have nothing to do with the poor old Doctor that is sent out with the ship. He is seventy-four years of age, exceedingly infirm and palsied, and so ill-provided with medicines that if sickness should break out in the vessel he could not meet the wants of the patients. To mend all, he is this day very ill himself and I have fears for the poor old man. If he goes I shall have care enough. Among my list of patients I have our most noble Captain, whom it is a privilege to be acquainted with.

Friday, 28th May: Wind unfavourable. We pass several vessels. Evening: We have arranged to hold two services on the Lord's Day on board. In the morning at 10.30 and in the evening at 7. I have been requested to preach the morning sermon.

Saturday, 29th May: There is scarcely any wind today. We are almost becalmed. I have a long conversation with the Captain upon religious subjects. He is deeply interested in our services to be held tomorrow. The decks are cleared out most beautifully and every preparation being made that I could desire . . . Those to whom I have administered medicine are all better.

Lord's Day, 30th May: A large well-dressed and attentive audience assembled on the quarter-deck for the worship of God. The hatchway was a very comfortable pulpit. A flag covered it; on which was spread out a large Bible . . . In the afternoon some Germans who are with us held a service. A young man, a surgeon dentist, officiated, reading prayers and a short sermon. Their singing was very sweet. After service I had a conversation with them and found they were Lutherans. In the evening Brother Kelly, one of the Presbyterian ministers on board, preached . . . The discourse was very neat. I could have liked it to have had more soul. The wind ahead we are making next to no progress. I have said to the Captain that the wind will blow favourably tomorrow. God grant it may do so, for if we go on as we are now, our provisions could not last us to the end of our journey. But I have no fear about anything, only I see the Captain is concerned. He is like a father to us all.

"Monday, 31st May: Very little change in the state of the weather. I am very sick for two or three hours. In the evening the wind blew up in the right direction and we have made some little progress, but we have been almost becalmed.

"Tuesday, 1st June: The wind today became unfavourable and blew dead ahead. I remained on deck with the Captain until after 11 o'clock p.m. During the night the ship rolled very heavily and many of the passengers as well as my dear wife became ill.

"Wednesday, 2nd June: The wind this morning blew strong and favourable, the first favourable day we have had for a long time; but the motion of the vessel was so heavy that many of the passengers continue ill. A little boy took a fit in a spasm of whooping cough. I went on invitation to see him. He breathed very heavily and gasped for breath on his mother's knee, the froth lying on his lips as his chest moved and fell. A few globules of belladonna and a spoonful of water relieved him almost instantly and before the Doctor reached him he was better. He came and with a feather applied croton oil to the child's mouth and throat. During the evening he called again with other medicines to see the child but the father of the child dismissed him and requested me to take the case, which I did with several others, some of whom offered to pay me but I refused all payment.

"Thursday, 3rd June: This day the child appeared quite well, but the poor Doctor himself has taken ill and is scarcely able to move about. He is the most infirm medical man I ever beheld and it must have been evident to _____ and Co. of Liverpool that such an infirm man could not in anywise be suitable to send out with passengers as the medical man. I never expect the old man to see Melbourne with his natural eyes. His illness troubles me.

"Friday, 4th June: I find influenza is at work in the vessel; several are ill of it. I findaconite and bryonia does well in the treatment of this illness. One poor woman I was brought to visit yesterday has been very ill all the voyage thus far. She has been vomiting and purged all the way. Last night for her bowels I gave arsenicals and this morning I find they are right but she continues to vomit. This morning I gave her Ipecac and she has continued better ever since. 3 o'clock p.m. The poor Doctor has just passed me now. He is scarcely able to walk. From my heart I feel for the poor man.

"Saturday, 5th June: The wind favourable today. We have also been sailing fast and fair all the night. All my patients are improving nicely save a little girl who is not anything better since yesterday. The poor old Doctor is better this morning but he has got into an awful mess with the passengers, which has greatly grieved the Captain. About 12 o'clock noon we pass a vessel so small she looks like a pleasure boat. Our Captain says she is going to the Mediterranean. She skims over the water like a sea-gull. We are now in Latitude 36 degrees 34 North, Longitude 15 degrees 6 West. A clear sky, a fair wind, a pleasant breeze and all going well, thank God.

"Sunday, 6th June: Brother Megaw preached this morning an excellent sermon. His voice did not reach all the passengers, and some who sat near him complained, but I heard all he said and a capital discourse it was . . . One man was present and gave good heed who a few days before said if he had his will he should hang a parson every week and a bishop every month . . . Just at 5 o'clock p.m. as we had finished dinner, the Captain, going up upon the poop called down to us that Madeira was in sight. We all crowded on deck and saw it in the distance, the Captain said about 35 miles off.

"Monday, 7th June: The patients under my treatment are all nicely improving, but there are others on board who have taken ill that have sent for me so that I have more to do now than the Doctor of the Vessel. Must now get out my medicine case.

"Tuesday, 8th June: We are now in Latitude 29 degrees, Longitude 20 degrees. Ever since Sunday night we have been making rapid progress, for during our service on

board in the evening we got into the trade winds and since then we have had a very pleasant voyage. This day Mr. B—, the wicked man who heard me preach on Sunday night, sent his wife for me. He was lying ill on his bed. He wanted medical advice. I gave him medicine. His illness is the hand of Providence for us ministers he cursed a few days ago and now he sends for me to cure him of his illness. A young gentleman, Mr. H—, has also taken ill and his illness is rather serious.

"Wednesday, 9th June: This day called into the female hospital by the husband of a young woman who miscarried on board and was very ill. The ship's Doctor has done her no good. While speaking with her and her husband and administering medicine the Captain came downstairs to the 2nd cabin to say that someone there had ripped up the bed of one of the passengers (they had the night before bedaubed the same person's face with treacle and otherwise ill-used him), for which he complained, and unless the guilty party were found out, he, the Captain, would stop the rations of all the passengers in the 2nd cabin. At the top of the stairs a man waited on me to go and see his wife, near dead with illness. During the night greatly exercised in mind as to many matters.

"Thursday, 10th June: All the patients are better, for which I thank God. I have told the Captain that I intend going down myself into the 2nd cabin and speaking collectively to the passengers about last night and the conduct of some of them the previous evening. He thanked me and hoped I would do so. I went down accordingly, at 10 o'clock a.m., all were called together and I gave them a very friendly address, which they took in a very friendly spirit, and at the end applauded me, cheering me up the stairs as I retired from them. I hope and believe we shall have no more unpleasantness during the voyage from these passengers.

"Friday, 11th June: We are now in Latitude 22 degrees North, Longitude 23 degrees 37 West. Our progress during the last few days has been very satisfactory. All the patients are now improving nicely save the young woman in the Hospital who is better only of her pains.

"Saturday, 12th June: Sighted a vessel this day, but not near enough to speak to her . . .

"Sunday, 13th June: The weather is very hot and everything is damp. We sighted another vessel today, which we soon overtook and passed, losing sight of her in a few hours. The Brethren Kelly and Megaw preached this day in the morning and afternoon. The days are now too short for an evening service. The man who said he would hang bishops and ministers attended with his wife. They were both well-dressed and attentive . . .

"Monday, 14th June: Today I called the brethren and Captain together and suggested that we, the Saloon passengers, should give the sailors a treat by having a tea meeting on board for them (after which we should have a public meeting for mutual enjoyment and for the profit of all). It was readily agreed to by the Captain and ministers . . .

"Thursday, 17th June: The Captain has fallen ill and absent from us now for the entire day.

"Saturday, 19th June: An interview today with the Captain. I find him ill and suffering from bad treatment of the same illness, inflammation of the spleen and stomach, in India. He places himself entirely under my treatment. Lord direct me how to use the proper remedies.

"Sunday, 20th June: The weather very rough with squalls. As soon as one is over the heat is intense. The heat makes the Captain worse. The first mate is also very ill. We sight a vessel but as the Captain is not on deck nothing will be done in the way of sending letters with her. We spoke to one another but neither appears to me to understand what the other says, and there the matter ends. At 2 o'clock I made an attempt to hold a service but a squall broke it up . . .

"Monday, 21st June: Thank God the Captain is improving very fast but the mate is worse.

"Wednesday, 23rd June: We are opposed by some three Saloon passengers in the object of our tea meeting. A man and his wife, who are not everything we could wish them to be . . . The other is the son of a Rector who I fear is no honour to his father.

"Thursday, 24th June: We have now ordered tea and sugar and flour for spice cakes and a plum pudding for the sailor's tea and have gone round and invited the sailors ourselves. We have determined to bear the entire expense ourselves . . . Our opponents have certainly gone systematically to work. A counter tea meeting has been attempted in the fore cabin, but as the Captain refused to give his consent to the thing the matter dropped.

"Friday, 25th June: Thank God we had our meeting . . . all our enemies are quiet. Mr. B— fell down upon a cannon and hurt himself so ill that he was carried in in a fainting state. His wife who before had given us so much wicked annoyance came running to me crying and beseeching my aid on behalf of her husband, believing that my skill was superior to the Doctor's for his case. He requested me to take it which I readily did. Arnica lotion and medicine were freely administered and before six hours had so reduced the swelling and inflammation that, although the injuries inflicted upon a man 14 stone weight falling down a rope ladder upon a cannon could not be slight, yet was he able before night to sit up and take his tea with us at our meeting. The Captain took the Chair. We had music and several songs between the speeches . . . The speakers were the Rev. J. Megaw, Mr. Hardie, the Rev. S. Kelly and myself. It went off well. At the close we voted thanks to the Captain who was cheered most heartily. And on board the vessel there was not known a dissatisfied person. Many good things were said (and well received). The Captain disclosed to the meeting that he himself did not think it possible to get up on board so good a meeting or anything like it. He never witnessed anything like it before and so greatly delighted was he with the whole proceedings that he would try to have such entertainments introduced on board all vessels with which he had anything to do.

"Sunday, 27th June: The weather unfavourable for service this morning on deck. I go downstairs and have a service for an hour in the steerage. Brother Kelly does the same in the Saloon. I have no sooner come upstairs than I saw a ship quite close to us and cried out to all the passengers, many of whom followed me up on to the poop. We had a short interview with the vessel and she promised to report us "with pleasure on her arrival in England". In the afternoon I preached on the quarter deck to a most attentive audience . . . A flying fish caught and given to my wife.

"Monday, 28th June: The wind very high but favourable. Our noble ship appears to fly over the waters. I greatly enjoy the sight. The motion of the vessel is most delightful to me, but I suppose there are not a few who find it otherwise.

"Wednesday, 30th June: The poor woman who miscarried in the Hospital is improving very nicely . . . The ship's Doctor and I are very good friends. It is well that it is so, for I feared all along to offend the old creature.

"Thursday, 1st July: We are this day six weeks at sea. Thus far I have enjoyed the voyage more than I thought I should. The Captain taught me today how to use the quadrant.

"Friday, 2nd July: Today we saw a whale. What an enormous beast he seems in the water. Coming right under the bowsprit of the vessel, I think the vessel struck him and made him keep out of our way for after he went down he did not again appear to any of us.

"Sunday, 4th July: In the evening I was sent for to visit a young man who, very ill, desired to see me. He has got a very sore throat and is feverish. I give him a bottle of medicine. His case is dangerous and I resolve to speak to the Doctor about him.

"Monday, 5th July: The young man himself and all who are about him say that he is better, but I see the hand of death upon him, which I state to the Captain.

"Tuesday, 6th July: I have taken a very severe pain today in my chest and feel very ill. It must be rheu-

matism in one of my muscles arising from damp. In the evening see the young man and again give him some medicine. I tell the people who stand about him that he will die and state my conviction that his death will be the result of drinking. Terror has laid hold of every one of them. I see the Captain who is not a little concerned.

"Wednesday, 7th July: This night while reading at the table before tea the Captain came to me, evidently affected, to say the young man had died.

"Thursday, 8th July: At the request of the Captain I officiate at the burial of the young man."

(Here the diary of the voyage ends, after having been kept, day by day, for seven weeks. It was another five weeks before the *Tornado* was to reach Melbourne, and the diary, describing the arrival, continues.)

"Thursday, 20th August: This night we have dropped our anchor in Hobson's Bay and at half-past seven o'clock we call the people, including the sailors, to our thanksgiving meeting to return our thanks in a public manner to God . . . Who thus brought us in peace and safety to our journey's end . . .

"Friday, 21st August: Landed this morning. The Captain took me ashore with himself and on our way to the office of his agents — Bros., Melbourne, we enquired and found out the address of the Rev. James Taylor¹ upon him I intend to call. On making my way to this Brother's home I passed the Baptist Chapel in Collins Street, of which he was the pastor. The sight of it greatly delighted me . . . The gates in front being shut I climbed over the iron railing and made my way into the interior . . .

"Sunday, 23rd August: This morning I preached in Collins Street Chapel, the congregation including a few from the ship who, learning from the papers that I was to preach came to the place . . . I was surprised to see how impulsive the people appeared to be . . . In the evening I preached for Bro. New in the Albert Street Chapel, but the place was so crowded that numbers were obliged to go away . . .

(Next day there were applications for Great-grandfather to preach at Geelong and at other churches in Melbourne, and he appears to have been invited to take charge of a church there at a salary of £600 a year, but he refused, stating that it was for Brisbane he had set out and it was to Brisbane he was going. It is recorded that shortly before he was to preach on the first Sunday in the Collins Street church, a rather fussy office-bearer hustled up to him: "Surely, Mr. Wilson, you are not going to preach wearing a beard like that." "Why not?" exploded Great-grandfather, "I didn't put it there." No doubt his climbing in broad daylight over the church fence also surprised Melbourne people.)

The diary continues:

"Tuesday, 25th August: This day we sailed away from Melbourne for Sydney.

"Saturday, 29th August: Landed this morning in Sydney at half-past two in the morning. Went to bed for a few hours and then rose early and went ashore . . . Made my way to the Baptist Chapel, Bathurst Street, where for the first time in my life I saw and heard the Reverend J. Voller. In the evening I preached to a very attentive congregation."

(That is the last we hear of the good ship *Tornado*, of her captain or of her old doctor. What happened, we wonder, to the woman who miscarried or to the wicked man who fell down the ladder onto the cannon, making further objections to the tea meeting impossible?)

"Sunday, 5th September: This being the Lord's Day and Mr. Voller being in need of rest, I preached twice for him. On both occasions the congregations were respectable, but one does not feel here the same spirit that there is in Melbourne.

"Tuesday, 7th September: This day received from Brother Voller a cheque for thirty pounds from the friends of a Society started by himself for the work of the Lord in the Colony of New South Wales. This will defray our expenses to Brisbane and leave a few pounds surplus in our hands.

¹ The grandfather of Mrs. Aeneas Gunn.

"Thursday, 9th September: Embarked tonight on the Clarence for Brisbane. We sailed out of Sydney, as we had into it, in the night time so that we could not see the Harbour. The wind, however, is favourable and the sea calm and beautiful.

"Sunday, 12th September: At half-past two o'clock this morning I landed at Brisbane. Two of the members were waiting on the wharf. They insisted on our coming ashore, and as we had been rather confined in our somewhat small state-room, for which we paid in all twenty pounds twelve shillings and sixpence and, for luggage, three pounds five shillings, the table fare being very plain indeed and our accommodation not first rate, we came ashore and found ourselves very much at home with our good Brother Swan, not many weeks a Deacon of the Church. A little after three o'clock in the morning we got to bed. I was up again after a good sleep at a little after six and we were greatly delighted with the appearance of the place. From our bed-room window we thought it the most beautiful place we had seen in our lives. At eleven o'clock entered the Police Court where a few were gathered together for worship and preached to them my first sermon.

"Monday, 20th September: We have engaged a servant today at £20 per year. We have also removed from Brother Swan's to a house taken for us in one of the most delightful situations we could possibly desire.

"Sunday, 30th October: Our congregation has increased so much that there is not sufficient room for us in the Court House . . . I have repeatedly entreated the Deacons to wait upon the Judge of the Supreme Court to request the use of it till the Chapel in the course of erection be fit to go into, but they have always refused to ask the Judge, believing he would positively refuse them. I went to him this morning after talking the matter over with my dear wife who very much encouraged me to go . . . I got the grant of the place in a moment but I was told afterwards there was not a man in Brisbane that would have done what I did in the matter."

So began the Ministry in Brisbane which was to continue for twenty years. They must have been arduous ones. He tells us on one occasion he picked up Wilkie Collins's "A Woman in White", which so absorbed him he could not put it down. When it was finally finished he said to his wife: "There, my dear, I have finished it and I shall never read another novel."

Indeed he had no time. Writing to his sister in Canada he says: "I have built a house. I have stumped trees and brought blisters on my hands times without number. We have the milk of a cow, no pigs, but I have just now two horses and a score of barndoors fowls. I have been able to secure a piece of ground and a homestead which I am trying to get brought under cultivation. Some day I may have a farm. I look forward to having one. I like the steady, quiet, plodding life of a farm. There is not much deception or roguery in it."

He also makes some interesting comments on life in Queensland in those days. "I wear", he says, "a long flowing beard as well as a moustache on the upper lip. This is almost necessary in this tropical country, where the heat of the sun in summer would very soon blister one's lip; but the heat is not so difficult to put up with as are the mosquitoes. They are the only drawback to this magnificent country."

"Labour here is very dear. We grow maize about Brisbane but not wheat. Potatoes are now five shillings per cwt. Maize has been twelve shillings per bushel, it is now six shillings. Butter is 3/6 per lb. Eggs 3/- a dozen. Labouring men get from five to eight shillings a day. The country grows bananas, pineapples, peaches and apricots, mulberries and grapes, but we have no English fruits. We have a kind of gooseberry but you would never think it. Lemons and oranges grow plentifully, so do citrons. Gardening would pay very well indeed but the great heat destroys the energies of the people in summer season, which here at least lasts eight months of the year. But the climate is good and very healthy."

By 1859 the new Wharf Street church was completed and there was no further need to hold services in the Supreme Court.

Meantime the home Great-grandfather had built on ten acres of bushland (later to become the well-known residential area of Gregory Terrace) had become the resort of the poor, the afflicted and all manner of people. (It was from an ex-bushranger, "the Wild Scotchman", who after his conversion settled down to a more prosaic existence as a cabinet-maker, that Great-grandfather later received the gift of a little writing desk for his study.)

Apart from his preaching he also daily visited the sick, not only as minister but also as physician. On many a night, it is recorded, he would be called from his bed and ride miles on horseback to see someone who was sick. Nor were these visits only to those of his own congregation, but to any who called upon him, whatever their beliefs. In addition, he appears to have, on occasion, acted as *locum tenens* for other Brisbane doctors. Very dear friends of the family were Dr. Joseph Bancroft, his son Tom and nephew Peter.

In 1862 he set out, travelling on horse and by steamer to visit all the then towns of Queensland. It is not difficult to visualize how formidable a journey that must have been.

No man could long continue so strenuous a life, and after he had been seventeen years in Brisbane his health broke down. He wished to resign from the church. His congregation, however, prevailed upon him to go instead for a three months' holiday to New Zealand, whence he returned apparently much improved in health. Two years later, however, there was a further breakdown. This time—it was in January, 1878—he resigned from his church, only to die the following month, not then turned fifty-five years. From the symptoms it may have been typhoid from which he died, but he certainly suffered also from a failing heart.

The contemporary Press paid tribute to him thus:

His removal from our midst will constitute a blank. Those who were accustomed to turn to him in their distresses, those who sought his medical skill and have proved his readiness at all hours of day or night or in any weather, to come to the help or alleviation of bodily pain, will indeed miss him. The Church of which he was pastor for twenty years will miss him too. Their loss is indeed great and his place they will not easily supply. In Mr. Wilson we had a man to whom a mean action was impossible . . . a man whose mental and physical frame seemed equally robust. His genial smile, his hearty laugh, his thorough freedom from selfishness presented him to us as a true Irish Gentleman. His sparkling wit, his ready anecdote, and his constant flow of spirits united with the zealous earnestness of strong conviction, combined to win for him admiration even from those who differed from his views and were not at one with his opinions. To what extent this was felt was visible in the large number who attended to show the last mark of respect. These were from all classes of the community and included the President of the Legislative Council (Sir Maurice O'Connell), the Premier (the Hon. John Douglas), the Leader of the Opposition (the Hon. A. H. Palmer), the Chief Justice (Sir James Cockle), the Postmaster-General, the Treasurer, the Attorney-General, the Minister for Lands and several members of the Legislative Assembly, whilst ministers of all denominations were present to show estimate of a man who was a pronounced and genuine Christian with a Catholic feeling of attachment to all.

So passed one who had a unique place in the early life of Brisbane—its one and only parson-physician. His descendants—children, grandchildren, great-grandchildren and great-great-grandchildren—number 145 scattered far and wide. No less than 15 have practised medicine or are studying medicine (all of the orthodox sort). Strangely enough, not a single one has been a parson.

Acknowledgements.

I should like to acknowledge the great help I have had in compiling these memoirs from my great-aunt Mrs. Roderick Macdonald, the youngest and only surviving daughter of my great-grandfather. I am also grateful to my uncle Benjamin Gilmore Patterson, mining engineer, of Mount Morgan, Queensland, who has already published a memoir of his own.

**ACUTE ACCIDENTAL POISONING IN CHILDREN:
ITS INCIDENCE, DIAGNOSIS AND
TREATMENT.**

By D. CLARK RYAN, M.B., B.S., D.C.H.,
Brisbane.

The pipe sounds sweetly whilst the fowler is ensnaring birds; and villainous poison lies concealed in sweet honey.—Ovid.

THE half-century just concluded has witnessed many remarkable advances in diagnosis and therapy, which, with improved standards of living and the development of prophylactic medicine, have had the effect of so reducing the over-all morbidity and mortality rates amongst the population, particularly amongst infants and small children, that many conditions hitherto considered as minor causes of morbidity and mortality have now come to assume a position of paramount importance in this regard. Congenital malformation is one such example of this trend amongst infants, whilst with the higher age groups trauma in its various forms is assuming a more and more important position. Through the agencies of several public bodies established for the purpose of protecting life from accidents, the public is becoming daily more aware of the dangers which beset our children in this regard. However, it is not generally realized that the incidence of acute accidental poisoning amongst the child population is also on the increase, and although from the point of view of fatalities and permanent disabilities it cannot compare with traumatic accidents, nevertheless it is a source of great anxiety, trouble and expense, which warrants continued efforts on the part of those concerned to curb this form of accident in our midst. One has only to work for a short period in the casualty department of one of our metropolitan children's hospitals to gain some idea of the prevalence of accidental poisoning, whilst a perusal of hospital records will show to what extent such accidents make demands on the energies of these institutions.

As with automobiles, domestic chemical preparations for a multitude of uses and an ever-increasing range of therapeutic agents are positively swamping the community. Many of these substances left lying carelessly about the home are quite capable of causing death to small children when taken in sufficient quantity. Yet time and time again one hears the distressing story, sometimes from the same parents on more than one occasion, of how their child has swallowed some noxious substance left easily within his reach, in milk bottles, soft-drink bottles, or that ubiquitous receptacle in Australian homes, the beer bottle. Unfortunately, from the therapeutic angle, modern chemistry has done more to complicate than to help matters. Most accidents of this nature are avoidable, and are caused by negligence. Various governmental regulations require manufacturers to mark their goods clearly if a poisonous substance is contained therein, and for fluids special "poison" bottles must be used. However, there still remains a great necessity for continued and increased publicity in these matters in an endeavour to educate the public better to this ever-present danger. Many manufacturers now include upon their labels instructions for treatment in cases of accidental swallowing of the contents, and this is a practice to be encouraged. Recently there has been an increasing tendency on the part of pharmaceutical companies to produce medicaments which pander to the puerile palate, so that where formerly children needed a great deal of patient cajoling in the administration of medicines, now we find them imbibing freely and sometimes demanding an array of pleasantly flavoured elixirs and brightly coloured sugar-coated tablets. Thus it is easy to realize how potentially dangerous as regards overdosage some of these substances may be.

Incidence.

In order to obtain some idea of the incidence of such accidents in our own community, figures were compiled from the in-patient records of the Brisbane Children's

Hospital for the four-year period 1946 to 1949 inclusive, to which were added figures representing admissions for acute accidental poisoning among children under the age of thirteen years to public hospitals throughout Queensland, other than the Brisbane Children's Hospital, for the corresponding period. The data are set out in Tables I, II and III.

Examination of these figures supplies the following information:

1. The total number of cases of acute accidental poisoning among children under thirteen years of age in Queensland is increasing each year in the metropolitan and country areas alike, although the rate of increase in the city is greater, being almost fourfold within the period described. This is in keeping with the present tendency of disproportionate increase in the population of Brisbane as compared with country areas.

2. The over-all incidence of accidental poisoning in the country areas throughout the State is almost four times that of Brisbane. Compared with other States, Queensland has a more equitable distribution of its country population.

3. The age incidence, as compiled from Table III, shows that the maximum occurs in the second year of life (47%), followed by the third year of life (29%), the fourth year of life (9%), the fifth year of life (5%), the first year of life (3%), and others (7%). Thus we see that most cases of acute accidental poisoning occur in the second and third years of life. These are the ages of the toddler, the explorer and the mimic, when it is part of a child's natural curiosity to place things in its mouth. In the United States of America it has been estimated that one-third of all cases of accidental poisoning occur among children under five years of age, and that approximately one-half of these occur in the second year of life. Our own figures agree with this statement. City and country figures parallel each other in this respect.

4. Concerning sex incidence, analysis of the tables reveals that 62% of cases occurred amongst males as compared with 38% amongst females, in both the city and the rural areas. Males predominate in all age groups, except in the five to six years group, in which the sex incidence is equal; and in the group at the age of greatest incidence they represent two-thirds of the total number.

As stated previously, these figures are representative of patients admitted to Queensland public hospitals, and thus serve only as a guide to the real incidence, since they do not reveal the number of patients treated in private institutions or the large numbers which receive treatment in the out-patient departments of our hospitals. At the Brisbane Children's Hospital alone, it is estimated that an average of approximately three patients each week receive out-patient treatment for ingestion of noxious substances. Then again, an estimation of the number of young children who are admitted to hospital with an erroneous diagnosis, whereas in fact they are suffering from accidental poisoning, must remain a matter for speculation. This is easily understood when one considers the age of maximum occurrence, a time when infants are unable to explain the train of events leading to their illness, and when one realizes the protean manner in which poisoning may present itself clinically. A consideration of all these facts clearly indicates that the real incidence of acute accidental poisoning among children must be greatly in excess of the numbers as revealed in the above figures.

In order to obtain some idea of the morbidity involved, statistics indicating periods of stay in hospital are presented in Table IV.

Thus we see that the total of 1024 patients were in hospital for a total of 3370 days during the four-year period under discussion, the average stay being 2.80 days. Mitchell and Nelson (1946) estimate that in the United States of America cases of accidental poisoning amongst children represent 1% of all paediatric admissions. Fortunately, this type of accident, whilst causing much morbidity, is not accompanied by that mortality incidental to other forms of trauma, such as accidents and burns. Table V displays the mortality figures from accidental

TABLE I.
Accidental Poisoning: Number and Age of Children Under Thirteen Years of Age Admitted to the Brisbane Children's Hospital, 1946 to 1949.

Age.	1946.			1947.			1948.			1949.			Total Cases, 1946-1949.					
	Male.	Fe-male.	Total	Male.	Fe-male.	Total	Male.	Fe-male.	Total	Male.	Fe-male.	Total	Male.	Fe-male.	Total			
Under 12 months																		
1 year and under	2 years	..	..	13	3	16	10	11	21	25	18	43	18	53	83	50	133	
2 years and under	3 years	..	..	1	2	3	8	12	20	17	10	27	17	9	26	43	33	76
3 years and under	4 years	..	..	—	—	—	1	2	1	7	3	10	7	2	9	15	5	20
4 years and under	5 years	..	..	—	1	1	1	2	3	—	—	—	—	3	3	1	6	7
5 years and under	6 years	..	..	—	—	—	—	—	—	—	—	—	2	2	2	—	2	2
6 years and under	7 years	..	..	—	—	—	—	—	—	—	—	—	1	1	1	—	1	1
7 years and under	8 years	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8 years and under	9 years	..	..	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—
9 years and under	10 years	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10 years and under	11 years	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11 years and under	12 years	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12 years and under	13 years	..	..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total under 13 years	..	..	14	7	21	21	25	46	50	31	81	63	33	96	148	96	244	

poisoning among children under thirteen years of age for the four-year period 1946 to 1949 inclusive, whilst Table VI represents death from all causes in age groups for the same period.

Ten of these deaths occurred in hospitals other than the Brisbane Children's Hospital. It will be seen that the fatality rate from poisoning compares more than favourably with the over-all death rate in the same period.

The poison "spectrum" is indeed a vast one and is ever increasing. In the United States of America it is stated that 400 poisons kill over 500 children annually. In our total of 1204 cases there are listed 135 different substances which have been ingested accidentally, and these are shown in Table VII.

A perusal of this list reveals that the poisons may be divided roughly into domestic and therapeutic agents and a small miscellaneous group. Domestic agents comprise by far the greatest number in both city and country areas, although there is a tendency for such substances to be implicated more frequently in rural areas. Kerosene is by far the commonest domestic agent, accounting for just over half the total number of cases for all poisons. This is readily understood when one considers the multiplicity of uses for kerosene in the community, from fuel and cleansing agent to internal therapeutic uses, particularly in country areas. Of domestic agents other than kerosene, petrol (16 cases), "Shellite", turpentine and arsenic (each 13 cases), phenyl (10 cases), nicotine sulphate, caustic soda and potassium permanganate (each nine cases),

appear to be the most numerous. Apart from these substances, the group of pest exterminators, including fly sprays, mosquito repellents, cockroach powders, fruit-tree and vegetable sprays, sheep and cattle dips, ant poison, and rat and dingo baits figure prominently, particularly in Queensland rural areas, where a vast range of primary production is supported, from cattle-raising and sugar-farming in the tropical north to dairying and wheat farming in the more temperate south. On the other hand, therapeutic substances as a cause of acute accidental poisoning in children are not nearly so frequent; phenobarbital leads with 27 cases, followed by aspirin (12 cases), strychnine tablets (eight cases), sulphadiazine (six cases), and others in lesser numbers. Here, urban cases tend to predominate.

Some indication of the distribution of these accidents can be gleaned from figures supplied from the office of the Queensland Government Statistician. Excluding Brisbane, where almost all admittances were from the metropolitan area, we find that (based on local authority areas) Johnston led with 65 cases, followed by Townsville (57 cases), Rockhampton (37 cases), Ipswich (35 cases), Toowoomba (34 cases), Cairns (22 cases), Atherton and Maryborough (each 20 cases), Herberton and Banana (each 19 cases), Cloncurry and Kingaroy (each 18 cases) and Bundaberg and Proserpine (each 16 cases). Thus it is evident that the incidence of accidental poisoning closely follows the general population distribution, with the possible exception of Johnston, which is a large sugar-growing area in the

TABLE II.
Accidental Poisoning: Number and Age of Children Under Thirteen Years of Age Admitted to Public Hospitals (excluding Brisbane Children's Hospital) in Queensland, 1946 to 1949.

Age.	1946.			1947.			1948.			1949.			Total Cases, 1946-1949.					
	Male.	Fe-male.	Total	Male.	Fe-male.	Total	Male.	Fe-male.	Total	Male.	Fe-male.	Total	Male.	Fe-male.	Total			
Under 12 months	..	..	..	3	5	8	5	3	8	1	1	2	8	6	14	17	15	32
1 year and under	2 years	..	..	62	31	93	60	38	98	81	30	111	75	51	126	278	150	428
2 years and under	3 years	..	..	35	25	60	48	21	69	42	32	74	45	21	66	170	99	269
3 years and under	4 years	..	..	12	11	23	17	5	22	14	11	25	13	5	18	56	32	88
4 years and under	5 years	..	..	10	5	15	4	1	5	10	3	13	9	7	16	33	16	49
5 years and under	6 years	..	..	5	5	10	1	1	5	—	3	3	5	2	7	11	14	25
6 years and under	7 years	..	..	1	—	1	4	1	5	—	2	—	1	1	5	4	9	9
7 years and under	8 years	..	..	5	1	6	1	2	2	1	1	—	3	—	3	10	3	13
8 years and under	9 years	..	..	2	1	3	—	2	2	—	—	—	—	—	—	4	3	7
9 years and under	10 years	..	..	—	—	—	2	1	3	1	2	—	—	—	—	1	3	4
10 years and under	11 years	..	..	1	1	2	1	—	1	—	—	—	3	3	6	5	4	9
11 years and under	12 years	..	..	2	1	3	2	1	3	—	2	—	2	4	6	6	6	12
12 years and under	13 years	..	..	—	1	1	2	2	4	1	1	2	2	3	5	5	7	12
Total under 13 years	..	..	138	87	225	147	80	227	153	88	241	165	102	267	603	357	900	

TABLE III.
Accidental Poisoning: Number and Age of Children Under Thirteen Years of Age Admitted to all Queensland Public Hospitals, 1946 to 1949.

Age.	1946.			1947.			1948.			1949.			Total Cases, 1946-1949.		
	Male.	Female.	Total	Male.	Female.	Total	Male.	Female.	Total	Male.	Female.	Total	Male.	Female.	Total
Under 12 months	3	6	9	5	3	8	2	1	3	9	7	16	19	17	36
1 year and under 2 years	75	34	109	70	49	119	106	48	154	110	69	179	361	200	561
2 years and under 3 years	36	27	63	56	33	89	59	42	101	62	30	92	213	132	345
3 years and under 4 years	12	11	23	18	5	23	21	14	35	20	7	27	71	37	108
4 years and under 5 years	10	6	16	5	3	8	10	3	13	9	10	19	34	22	56
5 years and under 6 years	5	5	10	1	4	5	—	3	3	7	2	9	13	14	27
6 years and under 7 years	1	—	1	4	1	5	—	2	2	1	1	2	6	4	10
7 years and under 8 years	5	1	6	1	1	2	1	1	2	3	—	3	10	3	13
8 years and under 9 years	2	1	3	1	2	3	2	—	2	—	—	—	5	3	8
9 years and under 10 years	—	—	—	2	1	3	1	2	3	—	1	1	3	4	7
10 years and under 11 years	1	1	2	1	—	1	—	—	—	3	3	6	5	4	9
11 years and under 12 years	2	1	3	2	1	3	1	2	2	2	2	4	6	6	12
12 years and under 13 years	—	1	1	2	2	4	1	1	2	2	3	5	5	7	12
Total under 13 years	152	94	246	168	105	273	203	119	322	228	135	363	751	453	1204

tropical north, with a population containing a large percentage of people of non-British stock.

Diagnosis.

From the point of view of diagnosis, cases of acute accidental poisoning among children may be considered to be of two main types, namely (a) those in which a specific poisonous substance is known to have been ingested, and (b) those in which, by the history or the physical signs and symptoms, or both, poisoning is suspected of having occurred. In the diagnosis of this latter group laboratory investigations may be necessary, so that in such cases it behoves us to collect, for analysis, specimens of urine, faeces, vomitus and first gastric washings. Poisoning may be acute or subacute. By virtue of the usual signs and symptoms, acute forms are more readily recognized than the chronic types, which, however, are probably the more common. With a clear and definite history, treatment alone is the problem. Generally speaking, cases of poisoning do not conform to clear-cut clinical pictures, so that when strange and bizarre signs and symptoms present themselves in children of toddler and pre-school ages, the possibility of the child's having swallowed a poisonous substance must always be entertained.

Usually, poisons affect several of the body's systems concurrently, although signs and symptoms referable to one particular system may predominate. In this respect the gastro-intestinal system is probably the most frequently involved. In 244 of our cases at the Brisbane Children's Hospital, where full records of the children's admissions were available, 49 patients had signs and symptoms referable to the gastro-intestinal tract. Almost all noxious agents provoke vomiting or diarrhoea or both when ingested in sufficient quantity. This is fortunate from the point of view of recovery. In particular, arsenic and mercury, as contained in many insecticides, and fluorides and phosphorus, as contained in insect powder and rat baits, are likely to act in this manner. Some brands of cockroach

powder contain sodium fluoride, which is very toxic to children. With the advent of modern safety matches and the use of newer rat poisons which are innocuous to man, phosphorus is no longer the danger that it was formerly. Nicotine sulphate, as used against aphid infestations of plants, may also cause profuse diarrhoea, as also may toadstools, overdosage with cathartics and so-called food poisoning.

The respiratory system is also frequently involved, and 51 examples were found in our series of admissions to the Brisbane Children's Hospital. No doubt this is due to the large number of cases of poisoning with kerosene, petrol, "Shellite" and turpentine. Such manifestations may range from mere transitory coughing spasms to bronchitis and bronchopneumonia, with signs of profound toxic effects. In the United States of America such poisoning is second only to acute poisoning with lye (caustic soda). In the past much controversy has arisen concerning the pathogenesis of the pulmonary lesions in cases of accidental ingestion of volatile hydrocarbons. In a detailed study of 25 cases of kerosene intoxication over a four-year period, Reed, Leikin and Kerman (1950) reach the conclusion that almost all the toxic processes in kerosene poisoning are due to the rapid absorption of inhaled kerosene. They state that the inhalation may be followed by (a) acute toxæmia with depression, (b) severe pneumonia with depression, and (c) severe pneumonia with degenerative changes in the liver, kidneys, lungs and heart. According to these authors, 56% of children affected present with coughing, choking and strangling, 52% with vomiting or abdominal pains or both, and 36% with lethargy, drowsiness or convulsions. Our own experience suggests a similar pattern, with the possible exception of convulsions and lethargy, which in our series did not occur so frequently. As regards signs and symptoms, they demonstrated an elevated temperature in 80% of cases, diffuse rales in the chest in 32%, and cyanosis in 8%. The findings in our own series agree with these figures.

TABLE IV.
Duration of Stay in Hospital of Children Aged Under Thirteen Years Admitted to all Queensland Public Hospitals, 1946 to 1949.

Period.	Males.			Females.			Total.		
	Number of Patients.	Total Days in Hospital.	Average Days in Hospital.	Number of Patients.	Total Days in Hospital.	Average Days in Hospital.	Number of Patients.	Total Days in Hospital.	Average Days in Hospital.
1946	152	464	3.05	94	247	2.62	246	711	2.88
1947	168	429	2.58	105	270	2.57	273	703	2.58
1948	203	553	2.72	119	390	3.28	322	943	2.93
1949	288	643	2.82	135	370	2.74	360	1013	2.81
1946 to 1949	751	2093	2.79	453	1277	2.82	1204	3370	2.80

On the other hand, Deichman, Kitzmiller, Witherup and Johansmann (1944) describe a typical case of fatal kerosene poisoning in considerable detail. They present evidence to support their thesis that pulmonary injury may be sustained by kerosene carried to the lungs in the blood-stream. In support of this thesis they present a series of animal experiments, in which kerosene was introduced parenterally into the body by intraperitoneal, hypodermic and intravenous injections, the possibility of inhalation being thus eliminated. They were then able to demonstrate the presence of necrotizing lesions in the pulmonary vessels and parenchyma.

TABLE V

Deaths from Accidental Poisoning: Children Under Thirteen Years of Age Admitted to all Queensland Public Hospitals Classified According to Nature of Poison Causing Death, 1946 to 1949.

Nature of Poisoning.	Deaths from Poisoning.				Total Deaths, 1946-1949.
	1946.	1947.	1948.	1949.	
Arsenic ..	1	2	—	1	4
Food ..	1	—	—	—	1
Kerosene ..	—	—	—	1	1
Methyl salicylate ..	—	—	1	—	1
Phenobarbital ..	1	—	—	—	1
P h e n o l ..	—	—	—	—	—
"Saphonia"	1	—	—	—	1
Stilboestrol ..	—	1	—	—	1
Unspecified ¹ ..	1	—	—	—	1
Total ..	5	3	1	2	11

¹ Office records showing cause not available.

John A. Nunn and Frank M. Martin (1934) have reported seven cases of gasoline and 65 cases of kerosene poisoning in children. They were able to demonstrate that one-third of the children concerned who inhaled the substances became quite ill whilst the rest remained relatively well. They concluded that whereas such substances as gasoline and kerosene are absorbed into the blood-stream from the stomach, absorption was quite slow, whilst lung absorption of these volatile compounds proved to be most rapid. They were also able to show X-ray evidence of pulmonary abnormality in some cases in which clinical signs were absent.

Cyanosis is a sign which, when appearing in children for some unexplained reason, should always prompt one to suspect poisoning, especially if the child has been quite well up until that time. The sign may be most alarming, especially to the parents. Recently much attention has been directed to the occurrence of methaemoglobinæmia in children, both in our own and in overseas medical literature. Of our 244 cases which were studied in detail, in 12 the children were noticed to have had some degree of cyanosis at some time or other. Ten of these were the result of the ingestion of volatile hydrocarbons, these being kerosene in seven instances, "Shellite" in two, and petrol in one case. Here, the cyanosis was almost certainly due to interference with the normal pulmonary gaseous exchange consequent upon inhalation of fumes. One child displayed cyanosis after having ingested phenobarbital,

and another after having swallowed a large number of tablets containing ferrous sulphate. Unfortunately, one did not have ready access to country records. Otherwise it might have been possible to discover many examples of methaemoglobinæmia as a result of the swallowing of various domestic substances, as reported by McDonald (1951). However, the metropolitan records do not reveal this tendency, even though the list of substances swallowed includes car polish, cleansing fluid, cloudy ammonia, floor polish, furniture oil, insect spray, paint, rat bait and shampoo. A single non-fatal case of acute profound cyanosis of unknown aetiology occurred in a boy not included in this series; in retrospect, this was almost certainly due to the ingestion of some benzene derivative. Paints, varnishes, lacquers, car polish, shoe polish, dyes and moth balls are common household substances which are capable of producing pronounced cyanosis, even when taken in relatively small quantities. Moth balls in particular are used extensively in the community, and are generally held to be quite innocuous. However, if sufficient quantity is swallowed it may prove lethal. Zuelzer and Apt (1949) report four cases of fulminating haemolytic anaemia in infants following the swallowing of moth balls.

The central nervous system appears to be involved quite frequently, either as an early or as a late phenomenon. The reaction varies according to the nature of the poison. Thus substances which cause cerebral stimulation may precipitate convulsions, as with poisoning by camphor, strychnine and other agents producing anoxæmia due to methaemoglobin formation. On the other hand, depression of the central nervous system, resulting in drowsiness or coma, appears to be more common. This includes poisoning with such therapeutic agents as barbiturates, opiates, bromides *et cetera*, as well as some anoxia-producing substances. Twenty-six examples of drowsiness occurred in our series, whilst ten patients lapsed into coma and six developed convulsions. Of particular interest is the case of a boy, aged two years, who had swallowed an unknown number of phenobarbital tablets twelve hours previously. He was unconscious upon admission to hospital, with a temperature of 101° F. Lumbar puncture performed shortly after his admission showed barbituric acid to be present in the cerebro-spinal fluid. He made a complete recovery over a period of five days.

In view of the recent report by Thompson (1950) on acute ferrous sulphate poisoning, it is interesting to note the course of our own case. The patient, a boy of fifteen months, who had ingested an unknown quantity of green, sugar-coated tablets containing ferrous sulphate, was unconscious on admission to hospital, with dilated pupils. There was a temporary response to gastric lavage and the administration of oxygen, "Cyclon" and brandy. Later, profuse diarrhoea occurred, and was followed by severe depression with cyanosis and then collapse requiring active intravenous therapy. Over a period of five days the patient recovered without obvious sequelæ.

Various skin eruptions may follow in the wake of acute poisoning. Atropine and related substances may produce diffuse flushing, whilst the rashes associated with intoxication by barbiturates, salicylates, sulphonamides, bromides, iodides *et cetera* have been described adequately. In a Queensland summer, atropine is capable of causing genera-

TABLE VI.
Deaths from All Causes and Rates per 1000 Children in Age Groups, 1946 to 1949.

Year.	Under 1 Year.		1 Year and Under 5 Years.		5 Years and Under 13 Years.		Total Under 13 Years.	
	Deaths from All Causes.	Rate per 1000 Children in Age Group.	Deaths from All Causes.	Rate per 1000 Children in Age Group.	Deaths from All Causes.	Rate per 1000 Children in Age Group.	Deaths from All Causes.	Rate per 1000 Children in Age Group.
1946	791	32.50	210	2.45	145	1.02	1146	4.53
1947	874	31.39	206	2.24	129	0.87	1209	4.52
1948	779	29.16	166	1.70	92	0.60	1037	3.74
1949	686	25.08	194	1.87	121	0.76	1001	3.46

lized erythema, *inter alia*. This alkaloid finds a wide range of use in pediatric practice, as in carminative and antispasmodic mixtures, in eye drops, and in mixtures intended for the relief of enuresis. Many plants of the *Duboisia* family (corkwoods) grow wild in parts of Queensland and New South Wales, and if ingested by children

days later, when an empty bottle of artificial colouring matter was found in the kitchen.

The condition of the pupils, the odour of the breath, the macroscopic appearance of any vomitus, and an examination of the mouth and larynx may all aid in determining the presence and nature of an ingested poison.

TABLE VII.

Accidental Poisoning: Children Under Thirteen Years of Age Admitted to all Queensland Public Hospitals Classified according to Nature of Poisoning, 1946 to 1949.

Nature of Poisoning.	Total Cases, 1946-1949.	Nature of Poisoning.	Total Cases, 1946-1949.
Acid	1	Morphine	1
Alophen pills	1	Mosquito repellent	1
Alcoholic	1	Mushroom	5
Ant poison	3	Nail polish remover	1
Arsenic	13	"Nembutal"	1
"Asafen" tablets	1	"Neozene"	1
Aspirins	12	Nicotine	3
"Aspros"	2	Nicotine and acid tablets	1
"Atebrin"	1	Nicotine sulphate	9
Atropine	4	Nose drops	1
Atropine Nux Vomica	1	Oil	1
"A.T.S." injection	1	Paint	1
Barbital	1	Paint remover	1
Barbitone	1	Paint thinner	1
Barbiturate	5	Paris green	2
Belladonna	2	Perfume	2
Benzine	5	Pertussis mixture	1
Berries	3	Petrol	16
Bronchitis balm	1	Petrol fumes	2
Calamine lotion	2	Pherdure	1
Camphor	1	Phenobarbital	27
Camphorated oil	5	Phenobarbitone	1
Carbolic	2	Phenol	7
Car polish	1	Phenol—"Sahponia"	1
Cattle dip	1	Phenyle	10
Caustic soda	9	Phosphorus	1
Cleansing fluid	1	Pills (unknown com-	1
Cloudy ammonia	2	(position)	1
Cochineal	1	Plant	1
Cockroach poison	4	"Polyhamen"	1
Codeline	1	Poppies pods	1
Copper sulphate	1	Potassium permanganate	9
Corn cure	1	Prouton tablets	1
Cough mixture	4	Purgative	1
Croton oil	1	Rat poison	6
D.D.T.	8	Salicylate	1
"Dettol"	2	Shampoo	1
"Dieselene"	2	Sheep dip	2
"Digoxin" tablets	1	"Shellite"	1
Drug	1	"Shell Tox"	13
Ear drops	2	Soap	1
"Emerald Oil"	1	Sodium fluoride	1
Ephedrine tablets	3	"Solyptol"	1
Ergot	1	Spirits of salts	4
Euonymus	5	"Steedman's Powders"	1
Fehling's solution	1	Stibesette	1
"Fly Tox"	4	Styrchnine	8
"Ford Pills"	1	Subphendiazine	6
Furniture oil	3	Subphagnidine	1
Hair lotion	1	Subphathiazole	1
"Hot Sniffer" solution	1	Sulphur	1
<i>Hydroxyppri perchloridum</i>	1	Suppositories	2
Hydrochloric acid	4	Syrup of sanagra	1
Hyoscine	1	"T.A.T." injection	re-
Hypo	1	action	1
Indefinite lead	1	Toothing powders	2
Insect spray	8	Thorn apple	1
Iodine	3	Turpentine	13
Iodized tablets	1	Vaccine reaction	1
Kerosene	618	"Vaccite"	1
Laxative overdose	5	"Vapo Rub"	1
Lead poisoning	1	Vitamin B tablets	1
Lighter fluid	1	Wart cure	1
Liniment	1	Wax matches	1
Lotion	1	Weed killer	2
"Lysol"	7	White spirit	2
Match heads	3	Not determined	12
Mercury	1	Unspecified ¹	200
Methylated spirit	5	Total	1204
Methyl salicylate	1		
Mineral	1		

¹ 115 of these were reported as cases of "food poisoning".

may cause flushing, nausea, dizziness, convulsions and eye symptoms. One child, aged nineteen months, was admitted to the Brisbane Children's Hospital with a history of his having become pink in colour, with a pink tinge to his various body secretions. Poisoning with an aniline dye was suspected but was denied by the parents until a few

treatment.

The subject of poisoning and its treatment dates back to earliest times. Man has always sought for and believed in antidotes, but until comparatively recent times these have often been useless, if not harmful. The use of gastric lavage has always been advocated and persists to today with little or no changes.

Identification of the poison, the amount taken and the period since swallowing are important. Unfortunately, this information is not always readily available. In our experience the time factor is almost always known, the nature of the poison is usually known, but the amount ingested frequently remains obscure. Consequently, many children are subjected to procedures which, if more accurate information was forthcoming, would not have been considered necessary.

Generally speaking, the management of acute poisoning in children may be considered as (a) prophylactic measures, (b) emergency measures and (c) general supportive treatment.

Prophylactic Measures.

Prophylactic measures concern themselves mainly with efforts on the part of all to educate people to the ever-present danger of poisoning among children. Noxious substances should be kept well out of the reach of toddlers. They should be marked poison and packed in their usual containers, not in an assortment of receptacles whence the child may mistake the contents for those usually contained in such a vessel. Similarly, all medicines issued by chemists should have written instructions regarding dosage, and tablets, pills and powders should be dispensed in bottles or screw-top jars, not in packages and cartons, as is frequently the practice. Special care should be taken to prevent overdosage with pleasantly flavoured medicaments intended for the child himself.

Emergency Treatment.

Emergency therapy may well commence on the telephone; advice given clearly and concisely here may mean all the difference between success and failure later on. Fortunately, the degree of parental concern usually proves to have been unwarranted, but this allows the medical practitioner no latitude in his duty to take a full history and to make a careful physical examination. The child's having vomited of his own accord does not necessarily justify one in refraining from further active measures. Provided that one is assured that a strong acid or alkali or a volatile substance such as kerosene has not been swallowed, one should advise an immediate emetic, be this salt water, mustard water, even dish water, or a finger introduced into the pharynx of the child. Further active therapy should wait until the patient is examined.

Gastric lavage has been used for centuries and has become so impressed upon the minds of the public and the medical profession alike that failure to employ the "stomach pump" in the management of acute poisoning is considered by many to be tantamount to medical malpractice. It has been the custom for some time now to refrain from lavage in cases of corrosive poisoning, but to employ it in almost all other forms of poisoning. However, recently some serious doubt has been cast upon the efficacy of such a procedure. Harstrand, Møller and Simesen (1942) studied the effects of gastric lavage upon 80 people and performed quantitative studies upon the amount of fluid returned and its content of the offending substance. Most of their cases were examples of phenobarbital poisoning. They demonstrated the striking result that in the majority of

cases phenobarbital failed to appear in the fluid returned, and that in the few cases in which it was demonstrated it was present only in very small quantities. In only five instances was there more than 0.5 grammes in the total washings. Also, only 75% of the fluid used in the lavage was returned; the remainder entered the intestine, a fact proven by X-ray methods. They reached the following conclusions: (i) generally speaking, the procedure is most inefficient; (ii) efficiency is increased by the use of relatively small amounts of fluid; (iii) the use of large volumes promotes passage of the fluid with the contained poison into the intestines; (iv) the bulk of the poison ordinarily passes out of the stomach rapidly; (v) after four hours the procedure is only exceptionally efficacious; (vi) generally speaking, emesis is preferable for a conscious patient; (vii) gastric lavage is usually contraindicated for an unconscious patient, but if performed should be combined with aspiration of vomitus from the mouth and pharynx.

As regards poisoning with kerosene, petrol and other volatile hydrocarbons, the position is not so clear. If one is guided by the advice of Deichmann, Kitzmiller, Withers and Johansmann (1944), immediate, careful and repeated lavage is indicated in order to remove the agent from the stomach before sufficient is absorbed to cause necrotic lesions in the lungs and other organs. However, this is not generally accepted, and according to Nunn and Martin (1934) emesis is preferable to lavage, especially in children. Because of the struggling and gagging which usually take place, the chances of aspiration of the volatile substance are enhanced, with consequent sequelae. Reed, Leikin and Kerman (1950) are even more conservative and suggest that lavage is generally contraindicated, even though they could not demonstrate any relationship between the incidence of pulmonary abnormality and lavage with vomiting. They maintain that it should be used only when large quantities of kerosene have been ingested and then only when all reasonable precautions are taken to prevent inhalation of vomitus. From my personal experience in this matter, I am in full agreement with these last-mentioned statements, for I have found that usually only small quantities have been swallowed; when larger quantities have been taken the child almost invariably vomits promptly of his own accord, leaving but minimal amounts in the stomach. It is only when large quantities are known to have been swallowed and retained, or when children are obviously ill on clinical examination, that lavage for kerosene poisoning is indicated. I do not agree to subjecting the usual patient—bright, alert, with but the odour of kerosene or petrol in his breath—to this usually terrifying and unsatisfactory procedure.

Even when lavage is considered necessary it may with advantage be combined with adequate emesis. This is particularly so when enteric-coated tablets have been swallowed; in this case some particles may be too large to pass through the stomach tube and will thus remain in the stomach unless removed by vomiting. Each individual case should be judged upon the special conditions prevailing, namely, the nature of the substance, the volume concerned, the time since swallowing, and the state of the patient. It is inadvisable to attempt to produce emesis in a semicomatose patient or to attempt to pass a stomach tube in a child who is in convulsions as a result of the ingestion of strychnine or some similar substance.

In order to assist the process of elimination, some authorities suggest that in certain cases a suitable cathartic should be administered, preferably being introduced into the stomach at the end of gastric lavage. In this regard the saline purgatives are preferable, as oily preparations may facilitate the absorption of such poisons as phosphorus and carbon tetrachloride. It is also suggested, particularly in cases of poisoning with phenobarbital, that daily colonic lavages be given, and in the light of the experiences of Harstand, Møller and Simesen (1942) this would appear to be justifiable in selected instances.

The use of antidotes has always captured the imagination of man, and in the past remarkable potions and concoctions

have been credited with miraculous powers of healing in cases of poisoning; but it is only in comparatively recent times that the subject of antidotes has been placed upon a scientific basis. When the nature of the poison is known a near-specific antidote may be administered; otherwise a so-called universal antidote is prescribed. This consists usually of powdered charcoal two parts, magnesium oxide one part, tannic acid one part. Such a mixture may be made easily in the home by the use of burnt toast for charcoal, strong tea for tannic acid and milk of magnesia for magnesium oxide. Charcoal adsorbs poisons such as strychnine; tannic acid precipitates alkaloids and certain glucosides; magnesia neutralizes acids and acts as a mild aperient. Other substances commonly used are as follows: milk and eggs, and sometimes sodium hyposulphite (*hypo*), for metallic poisons; potassium permanganate for phosphorus and barbiturate poisoning, used as a 1:5000 or 1:10,000 solution for gastric lavage; sodium bicarbonate, particularly when acids have been swallowed, and especially for salicylate and ferrous sulphate poisoning; soluble calcium salts, as calcium hydroxide for fluoride poisoning; sodium nitrite when cyanide has been ingested.

Antagonists are really physiological antidotes which counteract the effects of poisons after they are absorbed. Stimulant and convulsive poisons demand the exhibition of a cerebral depressant, such as sodium phenobarbital given intramuscularly, paraldehyde given rectally or intramuscularly, chloral hydrate given by mouth or by the rectum, or even a general anaesthetic to counter convulsions or delirium. Pilocarpine in adequate dosage acts specifically against atropine and belladonna poisoning, controlling the peripheral autonomic effects but leaving the central excitatory state unaffected. Cerebral stimulants, such as picrotoxin, strychnine or amphetamine, are required to counteract the effects of substances which depress cerebral function, especially phenobarbital. Methylene blue, administered intravenously as a 0.4% sterile solution, appears to act specifically in cases of true methaemoglobinæmia by rapidly converting methaemoglobin to oxyhaemoglobin.

Removal of poisons from the body after they have been absorbed, or their deposition in tissues where they remain harmless, still finds a place in the therapy of acute poisoning, especially where the heavy metals are involved. Until recently, efforts were directed at depositing such metals, especially lead, in the bones, by means of a diet of high calcium content with large doses of vitamin D. However, with the advent of BAL (dimercaptopropanol) we now have a substance which acts specifically by increasing the excretion of most of the heavy metals (mercury, lead, arsenic and gold). Nevertheless, it is not without its dangers, especially in cases of lead poisoning, when its injudicious use may precipitate lead encephalopathy. The use of BAL in the treatment of mercury poisoning has been of particular interest since Wankany propounded his thesis that at least some cases of pink disease may be due to subacute poisoning with mercury. I have seen one patient with atypical pink disease successfully treated with BAL at the Brisbane Children's Hospital. The amount of mercury excreted daily in the urine was doubled during this therapy, with a concomitant improvement in the patient's clinical condition. Similarly, whilst attending the children's clinic of the University of Amsterdam, I witnessed a dramatic cure in a case of calomel poisoning when BAL was exhibited. In this case the child's condition closely resembled a florid case of pink disease.

General Supportive Treatment.

General supportive therapy aims at combating shock, dehydration and infection. Fluid and electrolytes may be necessary, given either orally or parenterally. Even serum or blood infusion may be indicated. Oxygen, nikethamide and adrenaline may prove useful adjuvants to treatment, whilst in certain instances, particularly with deep coma, lumbar puncture may be helpful. Usually, infection follows inhalation of vapours or vomitus and is combated with sulphonamides or penicillin, or both, depending upon the prevailing features in any particular case.

Summary.

The incidence, diagnosis and treatment of acute accidental poisoning are discussed in relation to children under thirteen years of age. Figures are presented for the four-year period 1946 to 1949 inclusive, these being obtained from the in-patient records of the Brisbane Children's Hospital and from the offices of the Queensland Government Statistician.

Regarding incidence, the following facts are evident: (i) Acute accidental poisoning amongst Queensland children is on the increase. (ii) A total of 1204 children with this condition were admitted to Queensland public hospitals within the period under discussion. (iii) The age of maximum incidence is the second year of life (47%), followed by the third year (29%). (iv) Male children were involved twice as frequently as females. (v) One hundred and thirty-five different poisons were involved. (vi) Kerosene ingestion was responsible for just over half of the total number, being followed by phenobarbital (27), petrol (16), "Shellite", turpentine and arsenic (each 13), aspirin (12) and phenyl (10).

Regarding diagnosis, the following points are made: (i) The respiratory system appears to be involved most frequently, followed closely by the gastro-intestinal system; the large percentage of cases of ingestion of volatile hydrocarbons would appear to be responsible for this local pattern. (ii) The pathogenesis of the pulmonary lesions in cases of kerosene intoxication is discussed. (iii) True methaemoglobinæmia does not appear to be a common cause of cyanosis in the Brisbane metropolitan area.

Regarding treatment, the following points are made: (i) A plea is made for continued efforts to educate the public in matters relating to the avoidance of accidental poisoning of young children. (ii) The wisdom of routine gastric lavage is questioned, particularly in cases of kerosene intoxication in which it is suggested that a more conservative approach be adopted; it should be reserved in these instances for occasions when large quantities are known to have been swallowed and retained, or for the child who is obviously ill when first examined; in any case all due care must be taken to minimize the possibility of inhalation of fumes or vomitus. (iii) The use of specific and universal antidotes is discussed. (iv) Other points are mentioned in the management of acute accidental poisoning of children.

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**BENGAL ROSE AS AN AID IN THE DIAGNOSIS
OF "KERATO-CONJUNCTIVITIS SICCA"
(SJÖGREN'S SYNDROME).**

By KEVIN O'DAY,
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The Eosins found in commerce under the names of Bosin, Saffrosin, Primerose Soluble, Phloxin, Bengal Rose, Erythrosin, Pyrosin B, Rose B, a l'Eau, are all "acid" phthalein colours (Bolles-Lee, 1937).

BENGAL ROSE is a water-soluble dye and is used in the eye in a solution of 1% in chloroform-water. As it is not a commonly used histological stain, it is not always easy to obtain. A small drop on the end of a glass rod is instilled in the lower fornix, the eye is kept closed for thirty seconds, and the excess stain is washed away with normal saline. After this time any desquamating epithelial cells on the surface of the conjunctiva or cornea will be visible as small red dots. In an advanced case the whole of the ocular conjunctiva in the palpebral aperture will be stained intensely, appearing as two vivid red triangles with their bases on the limbus and their apices at each canthus. The surface of the cornea in the same area will be stippled with the stain. In milder cases the staining will be much more delicate and may be obvious only after examination with the loupe or corneal microscope.

Sjögren (1933, 1940) found that the diseased cells could be demonstrated with methylene blue, Biebricher scarlet red, or Bengal rose. He preferred the blue for the conjunctiva of the lids and the Bengal rose for the cornea. For clinical purposes the Bengal rose will suffice.

Although Sjögren's monograph was published in 1933, the diagnostic value of the Bengal rose stain has received very little recognition (Atanworth, 1951; Foster, 1951; Hamilton, 1947). The test is easy to apply, causes little discomfort to the patient and occupies very little time. The normal eye may show an occasional spot on the conjunctiva only. Clusters of staining points on the ocular conjunctiva in the palpebral aperture suggest the diagnosis of *kerato-conjunctivitis sicca*, especially if they are accompanied by similar areas on the cornea, which may be obvious only with the corneal microscope. It must be stressed that it is the combination of the corneal and conjunctival lesion which is pathognomonic of the condition. In senile dystrophy of the cornea, for instance, the staining is limited to the cornea.

Ten years' experience has proved the value of this test. *Kerato-conjunctivitis sicca* does not always present itself in a patient with marked arthritis, reduced vision, velvety thickening of the conjunctiva and filamentary keratitis. Very often there is no arthritis, no dryness of the mouth, little interference with vision, and only the vague symptoms of "burning" and discomfort associated with "chronic" conjunctivitis, a diagnosis suggested by the redness and thickening of the palpebral conjunctiva. Careful scrutiny of the cornea with the monocular loupe may reveal a little lack of the normal lustre which suggests that all is not well with the corneal epithelium. It is in such a case that the application of the Bengal rose test is indicated, as indeed it is in any "chronic, allergic, or occupational" conjunctivitis.

Summary.

1. The Bengal rose test is described and its application stressed.
2. The necessity for its use in every case of "chronic" conjunctivitis is urged.

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A NOTE ON THE USE OF ANTIBIOTICS IN THE TREATMENT OF INFECTIONS WITH SOME GRAM-NEGATIVE BACILLI.

By SHIRLEY V. KEATING, B.Sc.,
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Melbourne.

WITH the increasing supply and range of action of antibiotics it is becoming common practice, where the assistance of modern laboratory technique is not readily available, to presume the nature of the infecting organism or organisms on clinical grounds or from simple microscopic examination; the selection of antibiotic is then guided by previous experience or by consultation of a chart showing the action of antibiotics against the various organisms. A number of such charts is available. They are very useful as a preliminary guide, but they fail where there is variability in sensitivity amongst members of the same genus due to inherent differences and/or resistance acquired during inadequate treatment. Even within the same species differences may be found (Enticknap and Stephens, 1951; Garrod, 1951).

When the selected antibiotic fails to suppress the organism, the other antibiotics are usually tried. This

empirical procedure runs counter to the essentially scientific character of modern clinical medicine. Not only is this type of empiricism expensive and time-consuming, but possibly it allows unnecessary harm to be caused by the unchecked organism and encourages the development of resistance in other pathogens harboured by the host (for example, staphylococci).

Where the facilities are available, the infecting organism should be isolated and tested for sensitivity to antibiotics as a guide to selection of the antibiotic and appropriate dosage. The results obtained here with a number of organisms isolated during routine work, particularly strains of Proteus, illustrate the point just raised.

In the testing of sensitivities nutrient agar plates incorporated with the appropriate amount of antibiotics were prepared. One loopful of a six-hour or seven-hour nutrient broth culture of the organism to be tested was diluted in five millilitres of saline and a loopful of this diluted preparation was streaked on plates containing various concentrations of the antibiotic. As many as nine different organisms, including a control *Staphylococcus aureus* (strain F.D.A. 209), could be inoculated as a single streak on each plate. Readings were made after overnight incubation at 37° C. The results with 51 strains of Proteus, 46 strains of *Pseudomonas pyocyanea* and 12 strains of lactose-fermenting "coliform" bacilli are shown in Table I. These organisms were collected from specimens of sputum, pus, faeces and infected urine.

It is apparent from the results given in the table that there is wide variation in sensitivity to the antibiotics in the Proteus group, some organisms being sensitive to all three agents and some resistant to all three. In the largest subgroup (37%) aureomycin is definitely not indicated for treatment. In the *Pseudomonas* group of organisms there is some but lesser variation in reaction, 58% being resistant to all concentrations of each antibiotic used, while only two strains of the 46 tested showed reasonable sensitivity, and this was to aureomycin only.

TABLE I.
Results of Tests with Antibiotics.

Organism and Number of Strains Reacting as Shown.	Concentration of Antibiotic (γ per Millilitre).											
	Streptomycin.				Aureomycin.				"Chloromycetin."			
	1	10	20	500	0·1	1	5	10	1	5	10	20
Proteus (51 strains):												
1	-	-	-	-	+	-	-	-	-	-	-	-
1	-	-	-	-	+	+	+	-	+	+	-	-
1	-	-	-	-	+	-	-	-	-	-	-	-
6	+	-	-	-	+	-	-	-	-	-	-	-
3	++	-	-	-	++	-	-	-	-	-	-	-
19	++	-	-	-	++	-	-	-	-	-	-	-
4	++	-	-	-	++	-	-	-	-	-	-	-
1	++	-	-	-	++	-	-	-	-	-	-	-
1	++	-	-	-	++	-	-	-	-	-	-	-
1	++	-	-	-	++	-	-	-	-	-	-	-
1	++	-	-	-	++	-	-	-	-	-	-	-
1	++	-	-	-	++	-	-	-	-	-	-	-
6	++	-	-	-	++	-	-	-	-	-	-	-
3	++	-	-	-	++	-	-	-	-	-	-	-
2	++	-	-	-	++	-	-	-	-	-	-	-
1	++	-	-	-	++	-	-	-	-	-	-	-
<i>Pseudomonas</i> <i>pyocyanea</i> (46 strains):												
1	+	+	-	-	-	+	+	-	+	+	+	+
4	+	+	-	-	-	+	+	-	+	+	+	+
1	+	+	-	-	-	+	+	-	+	+	+	+
3	+	+	-	-	-	+	+	-	+	+	+	+
9	+	+	-	-	-	+	+	-	+	+	+	+
1	+	+	-	-	-	+	+	-	+	+	+	+
27	+	+	-	-	-	+	+	-	+	+	+	+
"Coliform" bacillus (12 strains):												
7	+	-	-	-	-	+	+	-	-	-	-	-
1	+	+	-	-	-	+	+	-	-	-	-	-
1	+	+	-	-	-	+	+	-	+	+	-	-
2	+	+	-	-	-	+	+	-	-	-	-	-
1	+	+	-	-	-	+	+	-	+	+	-	-

"+" indicates growth on nutrient agar containing the stated amount of antibiotic.

The number of strains in the "coliform" group was small, but it was still sufficiently large to show that random use of antibiotics is not to be recommended.

Summary.

The results of sensitivity tests against streptomycin, aureomycin and "Chlormycezin", with 51 strains of Proteus, 46 strains of *Pseudomonas pyoeyanea* and 12 strains of "coliform" bacilli, are given.

The results indicate that rational therapy in cases of infection with these Gram-negative bacilli requires preliminary testing of each organism.

Acknowledgements.

The writer is grateful to Professor Sydney D. Rubbo for his helpful criticism, to Dr. Hilda J. Gardner for supplying strains of organisms, to Mr. Glen Buckle for advice on the method of testing organisms for sensitivity, and to Mr. R. Christie for assistance in preparing the paper.

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Reports of Cases.

AN UNPLEASANT EXPERIENCE WITH HEROIN IN ANAESTHESIA.

By L. E. McDONNELL,
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Clinical Record.

A HEALTHY male patient, aged sixty years, robust and weighing about 11 stone, was to undergo cholecystectomy. He had been anaesthetized for cystoscopic examination by a general practitioner anaesthetist some months previously with thiopentone and ether, which produced a stormy and violent physical reaction. "Straight" thiopentone subsequently proved unsatisfactory for retrograde pyelography, as the dose to produce quiescence delayed return of consciousness for retrograde injection. However, thiopentone followed with cyclopropane was satisfactory in two successive cystoscopic examinations and so was chosen for the cholecystectomy.

Premedication with "Omnopon", one-third of a grain, and hyoscine, one one-hundred-and-fiftieth of a grain, was given one and a half hours before operation at 8 a.m. "Nembutal" (three grains) was given the night before to ensure sleep. Anaesthesia was induced with 0.5 grammes of thiopentone and established with cyclopropane. When the incision was made at 8.30 a.m., 1.5 millilitres (60 milligrammes) of "Flaxedil"¹ solution were injected intravenously; this produced adequate relaxation of the *rectus abdominis*, and after the peritoneum was opened a further 0.5 millilitre (20 milligrammes) was injected to insure relaxation for examination of the abdomen (8.45 a.m.). At this stage respiration was assisted on the breathing bag. Anaesthesia proceeded uneventfully until 9.15 a.m., when traction on a difficult gall-bladder caused laryngeal stridor. Ether was added to the circuit to deepen anaesthesia, and blind naso-tracheal intubation was performed without difficulty. The anaesthesia was maintained with cyclopropane and intermittent minimal amounts of ether for a further hour until 10.15 a.m., when closure of the abdomen was imminent. As considerable straining was present, one millilitre (approximately 2.2 milligrammes) of "Eulissin"¹

¹ "Flaxedil" and "Eulissin" are synthetic curarizing agents. The former, tri-(diethylaminoethoxy)-benzene triethyliodide, is relatively long-acting, and the latter, decamethonium iodide, is relatively short-acting.

was injected intravenously. Adequate relaxation followed within four minutes, but not apnoea. While the rectus sheath was being sutured heroin, one-sixth of a grain, was injected intramuscularly (there was a history of vomiting with morphine) to give an analgesic recovery. Ten minutes later (10.30 a.m.) respiration became shallow and finally ceased. This did not cause concern, as it was thought that the "Eulissin" with ether might have produced a delayed effect. Artificial respiration with oxygen was maintained by gentle inflation of the lungs, about 12 times per minute, with the breathing bag. The patient was moved to the anaesthetic room. His general condition throughout was excellent; his blood pressure was 150 millimetres of mercury, systolic, and 90 millimetres, diastolic, and his pulse rate was 70 per minute and remained so. When artificial respiration was stopped cyanosis developed. After three-quarters of an hour of apnoea it was suspected that perhaps the dose of heroin had been too liberal, as the pupils were now pinpoint and the patient was flaccid. It was considered that the small dose of "Eulissin" even with ether would not cause such a long period of apnoea. Tracheal suction was performed and elicited no reflex. Artificial respiration was continued for another hour (total, one and three-quarter hours), when signs of smooth involuntary breathing appeared. There was no sign of tracheal tug. Ten minutes later the patient was able to breathe without assistance, and was removed to the ward. As tone was present in the jaw, extubation was performed without reflex. Two hours later signs of morphine poisoning were still present, with pinpoint pupils and infrequent respiratory cycles. Picrotoxin (three milligrammes) was injected intravenously with immediate results, the patient moving and making attempts to sit up. Full consciousness returned half an hour later, accompanied by irregular vomiting during the evening. Recovery was uneventful.

Discussion.

I am sure it is not generally realized that heroin is an extremely powerful drug, with a therapeutic dose one-quarter that of morphine and four times more depressing to the respiratory centre. Therefore the therapeutic dose of heroin would be one-sixteenth to one-twelfth of a grain. This patient received a dose equal to the depressing effect of two-thirds of a grain of morphine, which, combined with two hours of anaesthesia, was quite sufficient to cause the prolonged apnoea irrespective of the relaxants used. The liberal dose of heroin was given in view of the patient's previous high tolerance to anaesthesia, but unfortunately without an exact knowledge of its comparison with morphine. The lesson is, never use a drug with which one is not completely familiar. Had the injection been given in the ward, the result might have been a catastrophe.

UNILATERAL ECTOPIA (IMPERFECT DESCENT) OF THE THYROID.

By F. F. RUNDLE, F.R.C.S.
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ECTOPIA of the thyroid is always of interest. The gland's abnormal level can usually be related to its position in one of the lower animals. Thus complete failure of descent, resulting in a lingual thyroid, leaves the gland in a site comparable with that in the primitive cyclostomes. At the other extreme there is mediastinal ectopia, the gland lying in apposition with the pericardium and corresponding in position to that in snakes. Most often multiple discrete nodules of thyroid tissue occupy the region of the second and third arch derivatives as in certain fishes. When the gland is found in these abnormal sites its gross anatomy is usually abnormal, the lobes and isthmus being ill-formed or unrecognizable.

The following case illustrates the phenomenon of imperfect descent of one lobe only.¹ Curiously enough, no

¹ This patient came under my care in the Surgical Unit, Saint Bartholomew's Hospital, London.

previous report of such truly unilateral ectopia is to be found in the literature. Some degree of asymmetry between the level of the two lobes may be regarded as normal, and it is possible that the significance of such gross asymmetry as that here reported has been overlooked in the past.

Clinical Record.

Mrs. E.R., aged thirty-two years, was a housewife. For three years she had noticed a swelling in the right side of the neck, which was gradually increasing in size. The swelling had appeared soon after her husband's death, but apart from transient loss of weight at the time there were no symptoms suggestive of thyrotoxicosis. There was no family history of goitre, and her previous health had been excellent. Her menstrual habit was normal and she had one normal child, aged five years.

The patient was a healthy-looking subject without clinical signs of hyperthyroidism or hypothyroidism. Examination of the neck (Figure I) revealed two apparently separate swellings. One, ovoid in shape and measuring about three and a half inches by one and a half inches, lay deep and medial to the right sterno-mastoid muscle. Its centre was in the same horizontal plane as the thyrohyoid interval. A slightly smaller swelling was present on the left side of the trachea in the position normally occupied by the left lobe of the thyroid. Both lumps were smooth, firm and mobile, moving upwards when the patient swallowed. No enlarged lymph glands were palpable in the neck, and examination of the systems generally revealed no abnormality.

The basal metabolic rate was 93% of normal. An X-ray examination showed the trachea to be displaced to the right in the root of the neck, but there was no evidence of compression of its walls.

At operation on November 19, 1948, both swellings were thoroughly explored, the upper flap being mobilized very widely and the infrahyoid muscles completely divided on both sides. The lumps on the right and left sides of the neck were found to be the corresponding lobes of the thyroid, connected by a tenuous and rudimentary isthmus at the level of the cricoid cartilage. Both lobes had the appearance characteristic of diffuse colloid goitre. The upper pole of the right lobe lay at a level above the body of the hyoid bone, and its lower pole was horizontal with the third ring of the trachea. Its shape was unusually ovoid, and a rather large pyramidal lobe projected from its inner border. The left lobe was normal in shape and position.

The right superior thyroid artery ran upwards and inwards in a distinct loop, while the right inferior thyroid artery was unusually small and pursued a vertical course upwards to enter the lobe at its lower pole. The location of the right recurrent nerve and inferior parathyroid was normal. No abnormality was noted in dissecting the vessels to the left lobe, the left recurrent nerve, or the left inferior parathyroid gland. The whole of the right lobe, the isthmus of the gland, and about three-fifths of the left lobe were removed. Convalescence was uneventful.

Histological examination of sections from both right and left lobes showed them to have similar appearances—namely, those of multinodular goitre without evidence of malignancy. The thyroid acini were split up by strands of coarse fibrous tissue. Most of the acini were large, colloid-containing and involutional.

Comment.

The conclusion that this patient presented unilateral ectopia appears to be justified by the gross disparity in level of the two lobes and by the abnormal course of the right superior and inferior thyroid arteries. Moreover, the inferior artery, usually distinctly the larger, was the smaller in this case.

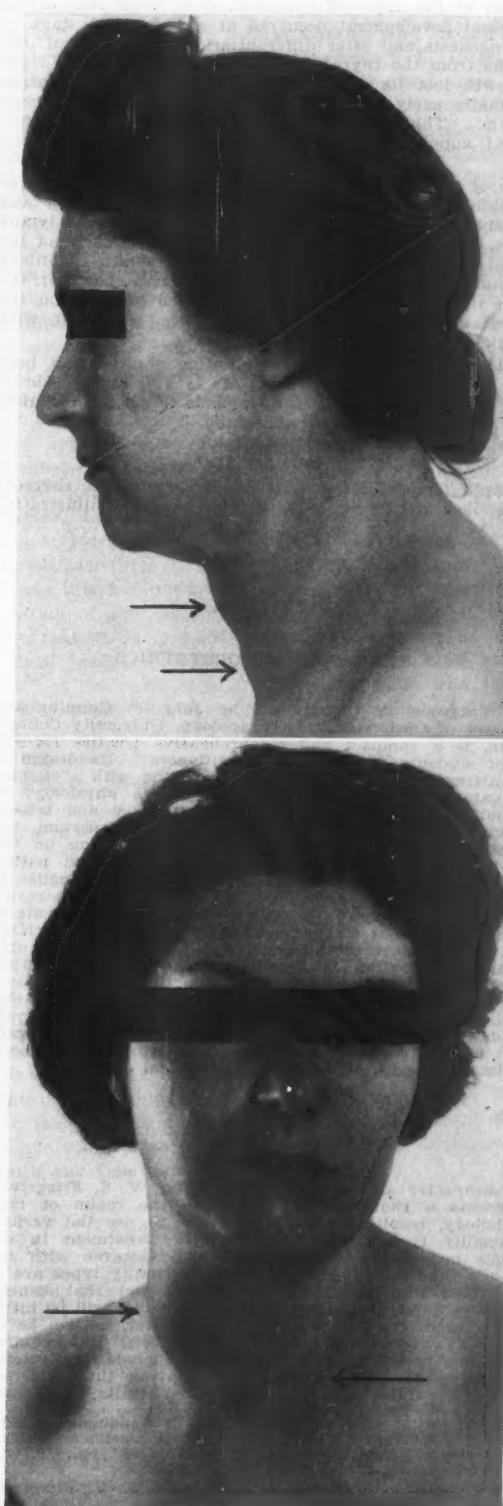


FIGURE I.

The arrows indicate the central level of the right and left lobes.

No phylogenetic homologue can be cited for this disposition of the thyroid. Indeed, it is clear that arrest of normal development occurred at an advanced stage of embryogenesis and after differentiation of the lateral outgrowths from the thyroid *Anlage*. Presumably the right outgrowth lost its connexion with the aortic bifurcation abnormally early in the "descent" of the heart and pericardium. This would agree with the relatively minor arterial supply ultimately derived from the subclavian arch.

Clearly the abnormality here described may lead to error in clinical diagnosis. One lobe is placed so high and laterally as to simulate a group of enlarged cervical lymph glands, and in the presence of goitrous enlargement of the rest of the gland the diagnosis of metastatic papillary carcinoma may be made. In the present case, however, the nature of the abnormality was suspected because, on the affected side, the rings of the trachea were felt with suspicious ease.

Incidentally, histological examination showed that both lobes had a colloidal structure. As is well known, abnormally situated thyroid tissue responds to general chemical stimuli exactly as does normal gland.

Summary.

Ectopia (imperfect descent) of one lobe of the thyroid is described and discussed with reference to an illustrative case.

Reviews.

A TEXT-BOOK OF OBSTETRICS.

A "TEXTBOOK OF OBSTETRICS", by John F. Cunningham, Professor of Obstetrics and Gynaecology, University College, Dublin, is a compact and comprehensive treatise for the use of students and general practitioners.¹ Its design is both attractive and practical. Commencing with a chapter on anatomy, it deals successively with the physiology of pregnancy, the conduct of normal pregnancy and labour, the pathology of pregnancy, labour and the puerperium, and operative obstetrics. It concludes with a section on the infant, including the problem of prematurity and pathological conditions of the newborn. Its excellent English is marred only by an occasional misspelling of "Caesarean", while its omissions are few. No specific mention is made of the pre-natal need of the mother for basic foods such as milk, meat, eggs, vegetables and fruit, yet academic minutiae on calcium and vitamins occupy an entire page. The author advises urine testing twice monthly in the last trimester—more frequently if there is evidence of toxæmia. With this we shall not agree. One feels also that a text-book should not omit the Lovsett technique in discussing breech extraction. Destructive criticism ends at this point, and the book can be commended as an excellent work on obstetrics.

TYPE PSYCHOLOGY

"PERSONALITY AND PSYCHOSIS", by Otho W. S. Fitzgerald, represents a thoughtful venture into the realm of type psychology, resulting in an endeavour to use the various personality types as an indication for treatment in the various mental disorders.² Many will disagree with the author's fundamental premise that personality types are to be divided into genetic and acquired, and that genetic influences alone decide whether the individual will be introvert or extravert, and whether, if the latter, he will be an impetuous extravert or a deliberate extravert. The acquired personality traits, the author considers, include the hysterical, the obsessional and the paranoid. Having thus analysed personality traits into three acquired traits and three

¹ "Textbook of Obstetrics", by John F. Cunningham, M.D., M.A.O., F.R.C.P.L., F.R.C.O.G.; 1951. London: William Heinemann (Medical Books), Limited. 9" x 5½", pp. 510, with 297 illustrations. Price: 40s.

² "Personality and Psychosis", by Otho W. S. Fitzgerald, M.A., M.D. (Dublin); 1951. London: Baillière, Tindall and Cox. 8½" x 5½", pp. 142. Price: 12s. 6d.

"clusters of genetic traits", he proceeds to use the twenty-four possible combinations for the diagnostic description of psychotic syndromes; but to describe two patients as "hysterical obsessional impetuous extravert" and "impetuous extravert hysterical obsessional" respectively would appear to cloud unnecessarily by a series of polysyllabic diagnoses that could be expressed in more simple terms.

However, the book provides an excellent account of the various personality traits, with a reasoned consideration of the relationship between such traits and the various so-called functional psychoses. The description of the genesis and results of the hysterical trait is excellent, although one may be permitted to doubt that love-craving in childhood is not a factor in the development of other personality traits. The book is to be recommended to the general reader, as it provides an introduction to the understanding of the psychoses on the basis of the pre-psychotic personality.

A SYLLABUS OF HUMAN NEOPLASMS.

In the preface of "Syllabus of Human Neoplasms",¹ R. M. Mulligan states that "for some years there has been a need for a book containing the pertinent pathologic facts about the more common human neoplasms together with a correlation of their salient clinical features. Such a volume could be of value not only as a text for the medical student, but also as a reference for the intern, the resident and the practising physician". The resulting book is not sufficiently comprehensive for the pathologist, but is a very suitable histological atlas for the clinician. The emphasis throughout is upon the microscopic characters of the various neoplasms; there are 230 excellent photomicrographs, and the important data relating to incidence and survival rates are given.

There could be an improvement in the presentation of the "salient clinical features". In the discussion of bronchogenic carcinoma, for example, a list of symptoms is given followed by a description of the various histological types of tumour. A more satisfactory manner would have been to classify bronchogenic carcinoma according to the mode of clinical presentation, such as mediastinal mass, "unresolved pneumonia", segmental collapse, pulmonary abscess *et cetera*. Incidentally we cannot agree with the statement that this carcinoma has a sex ratio of 3:1 in favour of males. In this country, at least, females are very rarely affected.

Students seeking to become competent histopathologists will find this book a handy stepping stone between the standard text-books and the more advanced books of reference for pathologists. For the average undergraduate there is little advantage in this expensive volume.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue]

"Hypertension: A Symposium", edited by E. T. Bell, M.D.; 1951. London: Geoffrey Cumberlege, Oxford University Press. Melbourne: Oxford University Press. 9½" x 6½", pp. 584, with 121 illustrations and figures. Price: 78s. 9d.

Contains 30 papers by leading authorities with subsequent discussion on many experimental and clinical aspects of hypertension.

"Renal Pelvis and Ureter", by Peter A. Narath, M.D., F.I.C.S.; 1951. New York: Grune and Stratton. 10½" x 7½", pp. 442, with 264 illustrations. Price: \$12.50.

Describes the embryology, anatomy, histology and certain aspects of the physiology of the renal pelvis and ureter from the scientific and clinical viewpoints.

"Surgery of the Stomach and Duodenum", by Claude E. Welch, M.D.; 1951. Chicago: The Year Book Publishers, Incorporated. 8½" x 6", pp. 350, with 79 illustrations. Price: \$8.50.

The author discusses the most common and important operations, for the benefit particularly of young surgeons.

¹ "Syllabus of Human Neoplasms", by R. M. Mulligan, M.D.; 1951. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 10½" x 7½", pp. 318, with 230 illustrations. Price: £4 0s. 9d.

The Medical Journal of Australia

SATURDAY, NOVEMBER 24, 1951.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ANNALS OF MEDICINE: A NEW JOURNAL FOR AUSTRALIA AND NEW ZEALAND.

WHEN it met at Perth in October, 1951, the Council of The Royal Australasian College of Physicians decided to undertake the publication of a new journal to be known as *Annals of Medicine*. It will be the official organ of the College. This step, which has been under consideration for some months, is an expression of the aims and of the natural growth of the College. For some three years a small volume of *Proceedings* has been published as a record of College meetings. This journal contained papers read at meetings if their authors did not wish to publish them elsewhere and it included information intended for Fellows and Members. It was thus what may be described as a domestic publication. The new journal, which will supersede the *Proceedings*, is intended to have a higher status. It will not be restricted to contributions dealing with internal medicine, but will, it is hoped, include those dealing with any of the medical sciences. The scope is therefore wide and covers such subjects as experimental and clinical research, pathology, bacteriology and immunology, biochemistry, physiology, endocrinology and so on. Of papers presented before the College only those of the highest order will be selected and suitable papers will be accepted from research institutes, from medical graduates and from other persons with a scientific training and background. An editorial board with representatives from the States of the Commonwealth and the Dominion of New Zealand will determine the acceptability of contributions.

By a strict insistence on a high standard in contributions it is hoped that work done in Australia and New Zealand will become still more widely known abroad than it is at present. It is hoped also that workers in both Commonwealth and Dominion will wish to publish their work in their own part of the world rather than in the centres of the Old World. This is an object for which THE MEDICAL JOURNAL OF AUSTRALIA has always striven. It is a legitimate object. Australia and New Zealand are situated at what may be called the periphery of the

scientific world. In spite of this they have both made important contributions to medicine in many of its branches and they have trained workers who fill and have filled positions in teaching and research in their own centres and abroad. It is a plaint too often heard that Australians and New Zealanders who become proficient in a selected field, are attracted to other countries. The migration (some rather unkindly regard it as defection) is not always a matter of financial reward; scientific status and recognition are likely to be important considerations. If Australia and New Zealand work is published in an Australian and New Zealand medium, some check may be given to this migration. Further, in proportion as these southern countries are more widely recognized overseas as worthwhile scientific centres, they will find it easier to attract workers from the Old World when no one from their own training centres is suitable for a position of responsibility or when an infusion of new blood is needed.

If this new project is guided wisely in its early years there appears to be a useful future for it. It will be admitted that the world of medicine is well supplied with medical journals—as mentioned a few weeks ago in these columns, there are probably between 8000 and 10,000 medical journals in the world today, and these journals publish something like 200,000 articles every year. Over against this fact we must remember that the comparative isolation of Australia and New Zealand makes it necessary that these practitioners should not neglect their medical reading. Some practitioners need the "strong meat" of the word; it is also true that those who do not think they need this type of literature would be better for an occasional attempt to digest some of it. Most men also find that some kind of revision of simple fare might be undertaken. We have always held that the average practitioner who reads THE MEDICAL JOURNAL OF AUSTRALIA regularly and with care will not miss much that he should have. We must also remember that more and more original investigation is being undertaken in this part of the world. The establishment of the National University at Canberra alone will provide new material for publication, and the work at other centres is growing. *Annals of Medicine* will, we hope, have the cream of this work sent to it; it will be published twice a year and the first issue will appear in May, 1952. The project is the outcome of conversations between the Council of The Royal Australasian College of Physicians and the Australasian Medical Publishing Company, Limited. It should meet with the approval and support of the medical profession and the cooperation of scientific workers in the Commonwealth and Dominion which it will serve.

LET US DO IT OURSELVES.

AT the present time, when restlessness, suspicion and mistrust are to be found in almost every nation, when the international tinder is in such a state that a spark of carelessness or of evil design may give rise to an enormous conflagration, it is essential for everyone in this community to be prepared to face an emergency. Weapons of destruction are so deadly and distance has been reduced to such a extent that a nation could be all but annihilated before its citizens had time to realize what was happening. There is no doubt that the knowledge that a prospective

opponent is well prepared will make an aggressor think twice before he makes an attack, and it is probably true, as Cervantes wrote many years ago, that to be prepared is half the victory. In the present instance it is not to general measures of offence or defence that reference will be made, but to those measures which are the proper and peculiar care of the medical practitioner. These measures include the prevention and the cure of disease among the members of the whole community. The duty of the medical practitioner and the persons with whom he has to deal are the same in war as they are in peace. In war fighting forces are increased in number and auxiliary arms of the forces grow in size; in addition, the geographical distribution of the people, combatant and non-combatant, is disturbed. People change their occupations, but the work of the doctor is still confined to the practice of medicine. He has to follow the geographical rearrangement of the community and it is clear that he cannot do this in a haphazard fashion. An impossible situation would arise unless some form of coordination was adopted.

In the war of 1939-1945 the Central and the State Medical Coordination Committees did splendid work—the medical branches of the armed services were adequately staffed, the civilian population was cared for medically according to the needs of different areas, and members of the medical profession had the satisfaction of knowing that they were making a notable contribution to the national effort. One of the most important facts about the whole of the plan was that members of the practising profession took an active part in all that was done by the Coordination Committees.

Today the medical profession of this country knows that plans must be made to meet conditions that would arise in an emergency. Its members have the chance to make plans for coordination on much the same lines as those operating in the 1939-1945 conflict. That is to say, they have the opportunity to give the planning into the hands of bodies on which their own corporate association is represented. Circulars have been forwarded to every practitioner asking for the completion of a form describing attainments and experience in practice. This circular is signed by the President of the Federal Council and the Director-General of Health of the Commonwealth. Practitioners have been asked to send the completed form to the secretary of the Branch of the British Medical Association in the State where they reside. The response so far has not been satisfactory. Readers of this journal are asked to realize that, apart from the question of national duty, they would be well advised to respond to the call of a body on which they, through their Association, are represented.

Current Comment.

MYOPATHY DUE TO A DEFECT IN MUSCLE GLYCOGEN BREAKDOWN.

MANY years ago Garrod described several cases of what he called "inborn errors of metabolism", cases in which an enzyme system or part of an enzyme system was lacking, so that some metabolite was not broken down in the normal way in the body, but the breakdown process stopped at an intermediate stage. Examples of such conditions are alcaptonuria, in which the breakdown of

tyrosine and phenylalanine stops at homogentisic acid, phenylpyruvic oligophrenia, in which phenylalanine metabolism stops at phenylpyruvic acid, and cystinuria, in which it seems probable that the metabolism of methionine does not go past the cystine stage. In the case of alcaptonuria it seems certain that the condition is due to a gene mutation leading to the absence of an enzyme system necessary for the further metabolism of the homogentisic acid, and a similar explanation seems probable in the other cases. If an enzyme lack due to a gene mutation is one which will interfere seriously with metabolism, the change will be lethal in the very early stages of embryonic life, so that not many kinds of such mutations can be seen in living organisms. What appears to be a new one is described by B. McArdle, who reports a case of myopathy due to a defect in muscle glycogen breakdown.¹ The patient, a male, aged thirty years, had suffered from pain in the muscle, following light exercise of any muscle, for as long as he could remember, and if the exercise was continued weakness and stiffness resulted. If he was gripping a heavy object, he might eventually have to drop it owing to pain and weakness; but his fingers remained in the flexed position, and it might be five to ten minutes before he could voluntarily extend the fingers fully. A normal subject was able to squeeze a sphygmomanometer bulb once every second without pain or discomfort for at least fifteen minutes, pumping 22 litres of air. The patient showed complete fatigue with severe pain after he had pumped two to three litres (120 to 150 squeezes). Under ischaemic conditions the effects were still more pronounced. Electromyography showed that the muscle shortening was probably due to contracture of a reversible kind. In spite of his small size the patient's appetite was enormous, but his basal metabolic rate was normal. The most striking biochemical change was a fall in the blood lactate content during and just after exercise, as opposed to a rise in a normal subject, and a rise in the blood lactate content after exercise, but not above the resting level. After adrenaline injections there was a rise in the blood lactate content, but this was very much less than in the normal person. Glycolysis with the production of lactic acid proceeded in the normal way in shed blood.

There is a close resemblance between the phenomena observed in this patient and the effects of poisoning with moniodoacetate. A skeletal muscle poisoned with moniodoacetate is able to contract normally for a short time, but it tires rapidly, shortens and passes into contracture. The contracting muscle does not produce lactic acid, although glycogen is broken down to a great extent, but only part way—not beyond the formation of glyceraldehyde phosphate. The enzyme which leads to further breakdown is poisoned, so lactic acid is not produced, nor is the glycogen broken down completely to carbon dioxide and water. The poisoned muscle can utilize lactic acid coming from elsewhere when oxygen is present. This is an extremely wasteful way of getting energy from glycogen; hence probably the very large appetite of the patient.

There is certainly a defect in glycogen metabolism in skeletal muscle in this patient, and everything points to a defect in the enzyme system necessary to change glyceraldehyde phosphate in the normal way. The defect may not be a complete one, for the muscle contractures do recover, and they do not do so in moniodoacetate poisoning.

PATHOLOGICAL FACTORS IN THE TREATMENT OF BACTERIAL ENDOCARDITIS.

IN the treatment of bacterial diseases by antibiotics the importance of attempting to establish prompt mastery over a potentially pyogenic condition is well recognized. It is interesting to find that pathological knowledge sometimes has a significance greater than its formal role of accurate anatomical description. Walter H. Sheldon and Abner Golden have studied certain features of bacterial endocarditis in this connexion, and in a recent article

¹ Clinical Science, Volume X, 1951, page 13.

remark that in the last four years they have encountered 12 cases of this disease in which single or multiple abscesses of the valve rings of the heart have been present.¹ After finding an abscess in the tissues in the neighbourhood of a valve ring in a patient who had died after unsuccessful antibiotic treatment, they elaborated a method of autopsy designed to discover this condition in subsequent similar cases. All valves were carefully examined, post-mortem clots were removed and suspicious areas were aspirated, and material so obtained was submitted to culture. A strip of tissue was then removed which included all the valves and rings, with adjacent mural endocardium and myocardium, and this was subjected to histological study. Material from 12 patients was so examined, and the findings were practically identical. The authors describe in full one case characteristic of the series. Vegetations were present over the region of the valve ring, but were notably absent from the free edge of the valve, a feature of all forms of acute or subacute endocarditis. In these hearts healing vegetations were characteristically found over thickened or pouched areas, which proved to be small abscesses; they contained some formed and some necrotic material, with blood clot and degenerate polymorphonuclear leucocytes, and were lined with granulation tissue. Occluded blood vessels were often found at the periphery of the abscess cavities. It should be stated that these findings were noted in cases of acute, but not of subacute, endocarditis; this is probably related to the particular type of organism responsible and to its pyogenic capacity. The authors found that it was easy to overlook these small abscesses unless careful inspection was made. One significant finding was that the vegetations were apparently secondary to the lesions in the tissues about the valve rings, an impression confirmed by microscopic study. The largest abscess found in this series was five centimetres in diameter, but even this appeared on the surface only as a slight and poorly defined swelling. Cultural studies showed that the commonest organism was a pneumococcus, though of a different type in nearly every case. *Staphylococcus aureus* was found three times; two of these organisms were coagulase-positive. Culture of the actual abscess contents was unfortunately made only in three instances, but each was successful in demonstrating the same organism as was found by other methods. Sheldon and Golden feel that their observations are significant; they point out that autopsy revealed a well advanced degree of healing in the lesions of the valves and of other tissues such as the lungs and the meninges, while the valve-ring abscesses were the only demonstrable site of active inflammation. This, taken in conjunction with the fact that antibiotic treatment was vigorously pressed, suggests that here was a group of lesions which demonstrated the limitations of such treatment. It might not be inaccurate to hold that valve-ring abscesses in acute endocarditis are analogous to residual intracranial abscesses in bacterial meningitis. The importance of these suppurative lesions is reinforced by the observation of Sheldon and Golden that rupture into the heart chambers or the sinuses of Valsalva was often observed, and by their connexion with mycotic aneurysms of the blood vessels in the valve rings. Sheldon and Golden think that these suppurative lesions are more commonly seen than before, and they are resistant to the penetration and action of antibiotic agents. The necessity for early and vigorous therapy in acute endocarditis is obvious.

KEROSENE POISONING.

Most discussions on treatment in cases of kerosene poisoning end on an unsatisfactory note. On the general principle that poisons taken into the body should if possible be removed if they cannot be more conveniently neutralized, the natural impulse is to empty the stomach.

However, pulmonary involvement appears to be the most dangerous complication of kerosene poisoning, and the possibility cannot be lightly dismissed that vomiting or even removal of the kerosene by means of a stomach tube may result in aspiration of kerosene. On the other hand, evidence has been produced, notably by W. B. Deichmann *et alii*,² that pulmonary injury may be sustained from kerosene carried to the lung by way of the blood-stream, as well as from its direct introduction into the lungs by aspiration, and that the former route is of great importance in the development of the lung damage, which, according to Deichmann *et alii*, results primarily from vascular injury. The corollary to this view is that the stomach should be emptied as quickly as possible. The dilemma that faces the clinician is to decide which course of action will do least harm—to leave the kerosene in the stomach and risk pulmonary involvement via the blood-stream, or to remove it and risk pulmonary involvement from direct aspiration. Deichmann and his colleagues had little doubt in 1944 that immediate and continued gastric lavage was imperative, but the work of other investigators indicates that the problem is not yet settled. Attention was drawn in these columns on September 16, 1950, to a paper by Reed, Leikin and Kerman, in which they opposed the use of emetics and also of gastric lavage except when large amounts of kerosene had been ingested. The comment was made at the time that the two points of view are something like opposite phases of the swing of a pendulum; the resting point remains to be found.

The problem appears to have been brought nearer solution by experiments carried out by J. A. Richardson and H. R. Pratt-Thomas on dogs and rabbits.³ Using a series of 38 dogs, they injected kerosene by the following routes: intragastric, intravenous, intratracheal, by instillation into a segment of small intestine and by stomach tube. The intragastric injection was direct through an abdominal incision, and the same procedure was carried out on three control animals, saline being substituted for kerosene. The dogs given kerosene by stomach tube were specially treated to prevent vomiting. The rabbits, 16 in all, were given kerosene intraperitoneally, intratracheally and by stomach tube. At suitable times the degree of lung affection was investigated, and this was considered in the light of the dosage and the route of administration of the kerosene. The results in general appear to underline the outstanding importance of aspiration in the production of serious pulmonary effects and to minimize the role of gastro-intestinal absorption. Richardson and Pratt-Thomas make the comment that on the basis of their findings, it is difficult to conceive of a child drinking a sufficient quantity of kerosene to produce a fatal effect only by absorption from the gastro-intestinal tract. The results, if translated into terms of a child weighing 50 pounds, suggest that, provided aspiration does not occur, a volume in excess of a pint would have to be swallowed to prove fatal. It is unlikely that a child would swallow this volume of an irritating fluid. On the other hand, aspiration of slightly more than a teaspoonful of kerosene would cause almost certainly fatal pneumonia. It is pointed out that the experimental findings are in no essential disagreement with those of Deichmann *et alii*, to which we have already referred, but their interpretation and the conclusions drawn differ greatly. From the practical point of view Richardson and Pratt-Thomas consider that if gastric lavage is resorted to, its primary intent should be as a precaution against regurgitation and subsequent aspiration rather than as a safeguard against gastro-intestinal absorption, and even then extreme care should be exercised. If the amount of kerosene ingested is small, it may be better not to use the stomach tube, especially if there are no signs of regurgitation. Since the oil passes rapidly through the intestine, a high cleansing enema should be almost as effective and less hazardous. The case against gastric lavage seems to be strengthening, except when a large quantity is swallowed. Emetics must be condemned.

¹ Annals of Internal Medicine, November, 1944.

² The American Journal of the Medical Sciences, May, 1951.

Abstracts from Medical Literature.

PATHOLOGY.

The Comparative Morphogenesis of Exogenous and Gonadal Teratoid Tumours.

NATHAN B. FRIEDMAN (*Cancer*, March, 1951) states that germinomata of the testis and ovary, tumours of primordial germ cells, ripen into germinal carcinomata, which in turn give rise to the somatic and trophoblastic tissues that make up teratomata and chorionepithelioma. Since germinomata, germinal carcinomata, teratocarcinomata, chorionepitheliomata and teratomata are all found in both the pineal gland and the thymus, the teratoid growths of these organs should be considered of germinal origin. The reasons for the localization of primordial germ cells in these two loci should be investigated. The occurrence of germinomata extragenitally favours the view that the primordial germ cells do not originate from the somatic elements of the uro-genital fold. Although teratomata, chorionepitheliomata, germinal carcinomata and teratocarcinomata have been observed in the sacro-coccygeal region, no germinomata have been identified there, and consequently a germinal origin cannot be ascribed to the sacro-coccygeal teratoid tumours. So many of the retroperitoneal teratoid tumours have proved to be metastases of primary genital tumours that one can question whether primary teratoid growths of the retroperitoneum exist. The old observation that a primary trophoblastic neoplasm of the testis may spontaneously regress should be reemphasized; the diagnosis of extragenital chorionepithelioma in man cannot be accepted unless the testes have been carefully studied and contain neither neoplastic tissue nor cicatrizing lesions.

Solitary Plasmacytoma of Humerus in a Mesothorium Worker.

GEORGE LUMB (*The Journal of Pathology and Bacteriology*, October, 1950) describes a case of solitary plasmacytoma of the humerus occurring in a thorium worker and reviews the literature of solitary plasma-cell tumours. He discusses the possible association of the occupation of the patient with the production of a bone tumour and considers that in the light of the physiologist's reports of the very slight radioactivity of the tumour any direct relationship is unlikely. He states that the histological picture is that of a tumour composed entirely of plasma cells and draws attention to the unusual form of giant cells and the large number of cells undergoing mitosis. The possible association of low-intensity radioactivity in the tumour with certain bizarre cellular appearances resembling degeneration effects in irradiated masses is discussed.

Carcinoma of the Pancreas.

J. R. MILLER, A. H. BAUGENSTOSS AND M. W. COMPTON (*Cancer*, March, 1951) have studied at necropsy 202 primary carcinomata of the pancreas, exclusive of islet-cell neoplasms, and classify them according to histological type and grade of malignancy. They state that

the mean age of the patients at the time of death was 60·7 years. More than two-thirds of the patients were in the sixth and seventh decades of life. There were 144 men (71·1%) and 58 women (28·7%). More than two-thirds (71·3%) of the carcinomata were situated in the head and less than one-third (28·7%) in the body of the gland. The carcinomata that originated in the head had a mean diameter of 4·2 centimetres, whereas those that originated in the tail had a mean diameter of 5·6 centimetres. Generally speaking, the higher the grade of malignant change, the larger was the neoplasm. Likewise, venous thrombosis, metastasis and suppuration occurred more frequently when the grade of malignant change was high than they did when the grade of malignant change was low. The grade of malignant change did not appear to have any influence on the incidence of jaundice, invasion or dilatation of the common bile duct, or invasion of the perineural lymph spaces. Some aspects of the behaviour of carcinoma of the pancreas appeared to be influenced by the histological type of the neoplasm rather than by the grade of malignant change. The incidence of invasion and dilatation of the common bile duct and jaundice and the incidence of invasion of the nerves were higher when the tumours were of ductal origin. Neoplasms of acinar origin, on the other hand, were associated with fat necrosis and suppuration when the carcinoma was of acinar origin; this suggests that this neoplasm is capable of functioning and producing digestive enzymes. The anatomical site of the carcinoma also seemed to influence its behaviour. With carcinomas of the body of the gland, the incidence of venous thrombosis and metastasis was much higher than when the lesion was situated in the head of the gland. Jaundice and hepatic insufficiency usually do not develop when the carcinoma is situated in the body of the pancreas. Consequently, patients who have carcinoma of the body of the pancreas probably live longer than patients who have carcinoma of the head of the organ. This may account for the higher incidence of metastatic lesions and venous thrombosis when the lesion is situated in the body of the organ.

Clinical Significance of the Paraurethral Ducts and Glands.

JOHN W. HUFFMANN (*A.M.A. Archives of Surgery*, May, 1951) states that the paraurethral ducts and glands comprise a mass of glandular and tubular structures about the female urethra. These homologues of the prostate gland are of clinical significance, not only because they are foci for acute and chronic inflammation of the female urethra, but also because of the diverse roles which they play in other lesions of the urethra and the urethro-vaginal tissues. Suburethral abscesses develop in obstructed and infected retention cysts of the paraurethral ducts. These cysts and abscesses are important factors in the etiology of acquired urethral diverticula. Paraurethral duct cysts, while usually small, may reach considerable size, producing cystic tumefactions beneath the urethra and in the anterior vaginal wall. Benign (adenomata) and malignant (adenocarcinomata) tumours of the urethra may develop from paraurethral gland tissue. Urethro-vaginal

fistulae may follow rupture of paraurethral duct abscesses into the vagina and urethra or severance of the channel of a paraurethral duct during surgical procedures on the anterior vaginal wall.

MORPHOLOGY.

Human Pyramidal Tract.

A. M. LASSEN (*Brain*, March, 1950) states that in an analysis of 331 cases he has been unable to find any distinct correlation whatsoever between the degree of destruction in the pyramidal tract and paralysis. Motor paralysis of a chronic nature apparently can occur in man with the pyramidal tract in any one of the following conditions: with total, severe, moderate or slight loss of fibres, or with its nerve cells judged to be in quite a normal morphological state. In the majority of cases of paralysis (57·5%) in the collected series, the pyramidal tracts were normal. It is difficult or impossible to judge what the true function of the human pyramidal tract may be on the basis of pathological data available. If the pyramidal tract plays a major role in voluntary motor function, then it must be assumed either that the activity of the neurons can be inhibited indirectly in many cases by cerebral lesions, or that afferent fibres playing upon its cells of origin may be affected. Still another possibility to consider is the exact role of the extrapyramidal pathways which reach the cord by means of two or more neuronal connexions. The author suggests that it is possible that the results of extirpation in animal experimentation upon subhuman primates have more scientific value than the collective pathological investigations on man.

Innervation of the Cornea.

E. ZANDER AND G. WEDDELL (*Journal of Anatomy*, January, 1951) present a study of the innervation of the cornea in a selected series of vertebrates by a variety of histological methods. The authors describe the general arrangement of the nerve fibres, the structural details of these fibres and their terminations, and the relationship of the tissues which surround them. The observations are discussed in relation to the literature, the neuron theory and their functional significance.

Tremor in Rhesus Monkey.

MALCOLM B. CARPENTER *et alii* (*Journal of Comparative Neurology*, August, 1950) state that tremor at rest was produced in two rhesus monkeys by electrolytic lesions immediately caudal to the subthalamic nucleus, dorsal to the lateral portion of the substantia nigra and lateral to the red nucleus in Forel's field H. These lesions destroyed fibres of the *brachium conjunctivum*, the medial lemniscus and the rubro-thalamic radiations. Analysis of the graphic expressions derived from cinematographic records permitted quantitative descriptions of the activity pattern in the antebrachia. These descriptions disclosed similarity of spatial pattern (flexor-extensor movements of the forearm compounded at the shoulder, elbow and wrist), grouping of individual movements (at irregular intervals and of variable durations), sequence (immediate), amplitude (variable), rhythm (irregu-

lar), frequency (five to six tremor cycles per second) and duration of single movements (0.12 to 0.25 second). The activity in each animal was that of simple tremor with ataxic qualities. Tremor at rest disappeared in one animal after ablation of the rostral half of cortical area 6 and the dorsal half of cortical area 8 contralaterally. No paresis developed and resulting motor deficits were minimal.

Os Opticus.

OTTO W. TIEMEIER (*Journal of Morphology*, January, 1950) states that the *os opticus* or posterior eye bone, which is a scleral bone partially or completely surrounding the entrance of the optic nerve into the eyeball of birds, was first described about one hundred years ago, and the present investigation was undertaken to determine its occurrence and distribution, its variation in size and shape, as well as the relationship of this bone to the other structure of the eye. An attempt was also made to ascertain its functions. The author found a typical *os opticus* in 219 different species; it was absent in many others. He lists those species in which it occurs and those in which it is absent. He finds that the bone consists of cancellous bone which contains many marrow cavities filled with marrow cells, blood vessels and cells, and fat cells. The fat cells predominate during the winter months, while the marrow cells are more abundant during the spring and summer months. The marrow cavities undergo striking medullary changes during the egg-laying cycle, similar to that described by previous authors for the marrow of avian long bones. Endosteal bone is formed during the growth of the ovarian follicles and disappears during calcification of the egg shell. No comparable bone has been found in any other recent vertebrate and probably no truly homologous structure in any fossil form. Several functions are suggested for the optic bone: (a) protection of the eye against shock; (b) maintenance of rigidity of the eyeball; (c) protection of the ventral segment of the optic nerve head.

Grafts of Testes.

R. G. WILLIAMS (*American Journal of Anatomy*, May, 1950) describes experiments in which autogenous grafts of testes, composed either of interstitial cells or of seminiferous tubules or of both combined, survived in transparent chambers installed in rabbits' ears and were studied at frequent intervals. The studies were terminated after fourteen months. At that time interstitial cells and Sertoli cells had gone through various changes, and spermatogenic cells were still present in some tubules, although reduced in numbers, but in other cases they were absent or separated from the wall and free in the lumen. After the first few months spermatogenic cells did not develop beyond the stages of secondary spermatocytes. Interstitial cells developed from cells indistinguishable from fibroblasts. They acquired cytoplasmic granules, reached a certain size, at which time they had a characteristic appearance, and then underwent regression and finally merged into the surrounding connective tissue. Interstitial cells seemed to be fixed postmitotically, some of them with a life-span of about nine months. There appeared to be a reciprocal trophic

influence between interstitial cells and tubules, the tubules being more dependent on the interstitial cells than the reverse. When interstitial cells were present Sertoli cells persisted in a characteristic fashion and produced what was interpreted as a secretion. When interstitial cells were absent the closed tubules underwent fibrosis with great increase in the collagenous fibres of the *tunica propria*, thus duplicating in young animals a histological condition generally found only in the aged. Injection of lutetinating hormone, which has been thought by some to have a stimulating effect on interstitial cells, may have produced some enlargement of these cells, but to no greater degree than occurred at times without the treatment. Its most striking effect was on the Sertoli cells.

Rare Anomaly of Flexor Digitorum Sublimis Muscle.

D. S. CHOWDHARY (*Journal of Anatomy*, January, 1951) describes a rare anomaly of the *flexor digitorum sublimis* muscle. It had its normal origin and gave rise to two superficial bellies, radial and ulnar, and one deep belly. The tendon of the superficial radial belly proceeded to the middle finger as usual, and that of the superficial ulnar to the ring finger, but it passed superficial instead of deep to the flexor retinaculum. The deeper belly, instead of dividing as usual into two bellies, continued as a single tendon to the index finger. There was no sign in the forearm or wrist of any muscle belly or tendon destined for the little finger. When the fibrous flexor sheath of the little finger was opened there was found opposite the proximal phalanx a thin, flat, tendinous slip lying slightly superficial to the tendon of *flexor profundus* and between this on the medial side and the fourth lumbrical on the lateral side. Proximally the slip arose in front of the fourth metacarpal as a condensation of the anterior interosseous fascia, and distally it was inserted like a normal sublimis tendon. From the literature it appears that the deep portion of the muscle is liable to considerable minor variations, mainly devoted to the index finger, and that absence of a tendon to the little finger and its replacement by a slip arising from the flexor retinaculum or the palmar aponeurosis has been reported.

Connexions of Tectum Opticum.

V. M. BUCHER AND S. M. BURG (*Journal of Comparative Neurology*, August, 1950) describe the fibre degenerations following injury to the *tectum opticum* as a result of the study of over 60 Marchi series of the brains of adult cats, in which very small lesions had been made in the diencephalon and mesencephalon. They state that fibres in the zonal and optic layers course chiefly caudalward. Evidence is presented of the existence of a tectal semidecussation, related to these layers, in the caudal part of the optic tectum, immediately rostral to the *commissura colliculi inferioris*. The *stratum lemnisci* carries numerous afferent and efferent fibre tracts, among the latter in particular two tecto-thalamic connexions, and a conspicuous mediodorsal tectosuprageniculate fascicle. Diverse components of the *commissura colliculi superioris* are discussed. The authors state that besides veritable commissural fibres, this structure con-

veys cortico-tectal elements and fibres from the dorsal supraoptic decussation. Tecto-reticular fibres cross in the commissure, while the tecto-pontine tract and the latero-ventral tecto-suprageniculate fascicle emerge uncrossed from it. Evidence is given of a conspicuous tecto-incertal connexion, related to the tecto-bulbar and tectospinal systems. The existence of an incerto-tectal pathway is confirmed. Cortico-tectal connexions, partly crossed, are described. The ventral supraoptic decussation ends in part in the optic tectum, and arises in part in this structure. The correlation between anatomical findings and physiological data is referred to briefly.

Functional Capacity of Isolated Human Spinal Cord.

R. A. KUHN (*Brain*, March, 1950) has estimated the functional capacity of the isolated human spinal cord by studying the reflex activity below the level of cord lesion in 29 men with verified complete cord transection. He states that in 27 cases, observations were possible at least two years after division of the cord, and in two cases examinations were begun immediately after injury and were terminated approximately seven months later. Levels of cord transection ranged from the second dorsal through the twelfth dorsal segments. Reflex activity below a total division of the human cord progresses, characteristically, through stages of spinal shock, minimal reflex activity, flexor spasms, and alternating flexor and extensor spasms. The majority of the men eventually reach a stage of predominant extensor activity. It seems clear that, in uncomplicated cases of complete cord transection with long survival, predominant extensor activity below the region of injury is the typical, final outcome. Although sudden total division of the human spinal cord results in immediate abolition of tendon reflexes below the level of transection and in complete paralysis of the bladder, certain other reflexes may or may not survive unaltered from the moment of injury. In two subjects studied from the time of injury the period of spinal shock was characterized by a complete absence of reflex activity below the level of cord division. The earliest manifestations of flexor activity appear in spinal men at the distal parts of the limbs, and this activity then successively involves the more proximal skeletal musculature. In men responding with fully developed flexor activity, stimulation of the plantar surfaces provoked a definite additive, distal-to-proximal sequence of muscular contractions. Proprioceptive stimuli were most effective in the production of reflex extensor activity below the level of cord division. Sudden stretching of the ilio-psoas muscle appeared to be an especially strong stimulus in the activation of generalized extension. Hyperactive tendon reflexes below the level of cord division, and strong Babinski reflexes in response to stimulation of plantar surfaces, were characteristic findings in the majority of these chronically spinal men. Reflex contraction of the bowel and of the detrusor usually occurred simultaneously in these subjects. The reciprocal relation between activity of the rectum and anal sphincter appears to be similar to that between the detrusor and external urinary sphincter.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on July 18, 1951, in the physiology department of the University of Melbourne. The meeting took the form of a "demonstration night".

DR. R. F. BUTTERWORTH showed a new type of operating cardio-scope and a dog with mitral regurgitation produced by section of the postero-lateral valve cusp under direct vision with the instrument. Two working models were shown: a mechanical heart lung, and a device for producing realistic pulsation of the dead heart to give practice in cardiac surgery.

DR. W. T. AGAR demonstrated the actions of antihistamines on the isolated intestine of the guinea-pig, with special reference to the atropine-like action.

DR. G. REED and MR. M. J. RAND demonstrated the preparation in stable form of the vasoconstrictor of blood serum. Records of kymograph tracings illustrating its pharmacological properties were shown. These were vasoconstriction in the hind limb, kidney, lungs and heart, constriction of bronchioles and liberation of adrenaline from the adrenal glands of the cat; contraction of several varieties of plain muscle was also shown. The substance was said to be a tryptamine derivative.

ASSOCIATE PROFESSOR F. H. SHAW, MR. J. F. MAINLAND, MR. K. H. SHANKLY, MR. J. B. MEARES and MR. I. D. DE LA LANDE showed the following: (a) Modern electronic methods of registering blood pressure, contraction of nictitating membrane and calibre of the ear vessels. This apparatus will be used to investigate the blocking action of ganglionic paralysants. (b) A demonstration of end plate potentials in rat striated muscle. (c) A new test for screening chemical substances for analgesic activity. (d) Recirculation of fluid through isolated frog heart. This was said to give a more sensitive preparation for the assay of acetylcholine, adrenaline *et cetera*.

DR. E. R. TRETHEWIE gave a demonstration of simplified electrocardiography, three leads only being used (bipolar chest lead with the xiphisternum as the common terminal and the other alternately the manubrium, the left mid-axillary line, and the right side of the chest posteriorly), so that each was at right angles to the other. Coronary occlusion and angina (proved at autopsy or deduced on strong clinical grounds) were shown to have a diagnostic component in these leads when the usual tracing I, II, III, IIIB, CR, CF, V₁ to V₄ did not conclusively reveal disease.

Salicylate action (sodium salicylate, para-aminosalicylic acid and acetylsalicylic acid) was shown to inhibit the release of both histamine and "S.R.S." from the sensitized perfused lung injected with antigen. The effective concentration of salicylate was just that which had an antipyretic effect in rheumatic fever, and that aspect and a possible role of para-aminosalicylic acid in exudative tuberculosis were discussed.

Barbiturate action—an effect of barbiturate in inhibiting the release of adrenaline from the suprarenal gland and also from the splanchnic nerves in the absence of the adrenals—was shown. Skin temperature studies on patients also showed a rise following administration of barbiturate. The possible significance of the findings in relation to the useful therapeutic effect of barbiturates in hypertension was discussed.

MR. D. DEWHURST first described a method of following ionic changes at a cell boundary. It involved the measurement of the apparent electrical capacitance at the interphase. Mr. Dewhurst then described a new type of display for use in electrocardiography, which consisted of a cathode ray oscilloscope representing in one display all the data available in the usual set of traces. Degeneration in skeletal muscle was investigated by use of the two-channel electromyograph, which presented simultaneously the activity of any two opposed muscles.

DR. E. M. TRAUTNER, MR. M. MESER and MISS M. J. BAILIE demonstrated the effect of tigloidine and procaine on the recovery of the electrically stimulated isolated sartorius of the toad *Bufo marinus*, and discussed it in its relation to the use of tigloidine as a non-toxic atropine substitute in the treatment of Parkinsonism. (See THE MEDICAL JOURNAL OF AUSTRALIA, 1951, Volume I, page 751.)

The electrophoretic separation of protein mixtures on filter-paper (Cremer and Tisellus, *Biochemische Zeitschrift*, 1950, Volume CCCXX, page 275) was shown, human plasma

being used as substrate; the clinical significance of the method, especially in view of the heterogeneity of the γ -globulins in the pathologically changed blood serum, was pointed out.

In Warburg apparatus the respiration of guinea-pig brain in Krebs phosphate Ringer solution was demonstrated, as also was the inhibition of the respiration in the presence of "Veronal". In parallel experiments it was shown that "Veronal" did not inhibit the oxidation of succinic acid by brain tissue; succinate had recently been proposed as an analeptic in cases of barbiturate poisoning (Barrett, *Annals of Internal Medicine*, 1949, Volume XXXI, page 739).

MR. R. MORRIS demonstrated some of the apparatus commonly used in the physical chemical investigation of protein solutions. In connexion with a detailed investigation of electrolyte-protein interaction, in-vitro studies of binding affinity by conductivity, E.M.F., and membrane equilibrium methods were shown.

DR. S. ROSE demonstrated that adrenaline injected intrathecally stimulated the hypothalamic-pituitary-adrenal axis. An ACTH and cortisone-like response was obtained, which might be of value in the treatment of such conditions as rheumatoid arthritis and asthma. Moreover, adrenaline injected into the cerebro-spinal fluid did not reach the peripheral circulation, so that there was no change in pulse rate or blood pressure.

DR. D. A. DENTON gave a demonstration of the oesophageal fistula technique in the sheep. By that technique, large volumes of saliva could be obtained from the animal. The fluid contained sodium in considerable excess of chloride relative to the normal extracellular fluid electrolyte pattern. The real activity during the disproportionate electrolyte subtraction stress was such that chloride in excess of sodium was excreted in the urine, and the ratio of chloride to sodium in the extracellular fluid remained constant. That mechanism operated in the presence of reduced osmotic pressure in the extracellular fluid, and also despite a lowered glomerular filtration rate. Those findings raised doubts as to the validity of the generally accepted T_m concept of renal tubular reabsorption of electrolytes.

DR. I. R. McDONALD illustrated the desirability of comprehensive and rapid electrolyte analysis in the body fluids of patients with severe water and electrolyte disturbances by the presentation of findings in several patients. The clinical histories presented included those of patients with anuria, diabetic coma and paralytic ileus. The value of the electrocardiogram in diagnosing states of potassium depletion was illustrated.

MR. J. MUNRO, MRS. W. MORCOMBE and MRS. S. SIMON demonstrated the various analytical methods used in the department. These included the following: (i) Flame photometry: the ease and speed with which sodium and potassium estimations could be made by means of the Beckmann flame spectrophotometer were demonstrated. (ii) Estimation of carbon dioxide and bicarbonate with the manometric Van Slyke gas analysis apparatus. (iii) The potentiometric method of estimating chloride in plasma. (iv) Determination of the pH of body fluids by means of the Jones pH meter. The methods were selected because of their accuracy, and because the result could be obtained in a short time.

DR. H. HARRIS discussed the electrolyte pattern in experimental anuria. Evidence was adduced to show that in that condition a considerable shift of water, sodium and chloride occurred from the extracellular fluid into the cells. The changes resulting from accumulation of metabolic end products were shown to be superimposed on an electrolyte pattern which was already modified by the water and electrolyte shifts. Gross pathological changes in the adrenal glands from hyperplasia to haemorrhage were shown to be a consistent feature of acute anuria in those experiments.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held on October 5, 1951, in the Anatomy Lecture Theatre, Frome Road, Adelaide.

An Epidemic in Sheep due to *Salmonella typhi-murium*.

DR. P. S. WATTS said that during the summer a widespread epidemic due to *Salmonella typhi-murium* had occurred among sheep. It had started in the south-east, but had rapidly spread as far north as Burra. Large numbers of sheep were affected, and about 3% to 5% had died. The mortality rates on each property were almost identical. Dr. Watts said that the disease should be communicable to man, as the organism was the cause of about one-third of all human cases of bacterial gastro-enteritis. Nevertheless, despite complete lack of precautions, no human case could be found. It was probable that the epidemic had originally been caused by sheep "travelled in" from Victoria. After establishment in any area, the disease was spread by carnivorous birds, which remained infective for three weeks after eating infected carcasses. The infected droppings of such birds fouled the water supply when it was concentrated owing to drought conditions, and thus infected the sheep. Earth artificially contaminated remained infected for forty days. Water supplies were also infective for long periods. Outbreaks also occurred in the winter, but only in "travelled" sheep. Dr. Watts said that the syndrome had been reproduced artificially. Sheep were infected, and when they were normal and no longer passing the organism they were starved. *Salmonella typhi-murium* was then again recovered from their faeces.

Anatomical Aspects of Emotional Control.

DR. W. R. ADEY discussed anatomical aspects of emotional control. He said that the first attempt in recent times to assign the control of emotional functions to particular regions of the brain was by Papez in 1937. Papez had suggested that the hypothalamus, the anterior thalamic nuclei, the gyrus cinguli, the hippocampal gyrus, the hippocampus and their interconnections constituted an harmonious mechanism concerned in emotional control. The experimental investigation of that hypothesis, principally by Bucy and Klüver in the monkey and by Bard and Mountcastle in cats, had indicated that profound alterations in behaviour followed various ablations of those structures. Bard and Mountcastle had observed that total removal of the neocortex in the cat, with careful preservation of the cingulate cortex, the hippocampal gyrus and the hippocampus—the so-called rhinencephalon of earlier workers—produced an abnormally placid animal totally devoid of any emotional reaction to major assaults on its person. If in such animals either the cingulate cortex or the hippocampal gyrus was removed, the placid state was abolished and the animals became extremely vicious. Such a state could also be produced by ablation of the amygdaloid nuclear complex in an otherwise intact animal. Simple removal of the hippocampus was followed by increased pleasure reactions. Bard and Mountcastle envisaged the amygdala as acting as a funnel through which inhibitory influences from the limbic cortex, the neocortex and the amygdala themselves exerted a suppressing action on brain-stem mechanisms.

Dr. Adey went on to say that Bucy and Klüver had carried out extensive lobectomies in monkeys, the ablations including most of the hippocampus, the amygdala and the hippocampal gyri. After operation the behaviour of the animals was characterized by "psychic blindness"; although retaining essentially normal vision they seemed unable to recognize objects by sight alone. They had a strong tendency to place every object in the mouth and to smell it. Hypersexuality was striking, and the motor and vocal manifestations of angry behaviour commonly seen in the rhesus monkey were absent or greatly diminished. An immediate post-operative change to carnivorous dietary habits was seen in all animals.

Dr. Adey then said that changes in behaviour could also be produced by hypothalamic lesions. Wheatley had found that, with carefully placed lesions produced by the stereotaxic method in cats, damage to the ventro-medial hypothalamic nucleus was constantly followed by savagery. Brooks had found that such lesions in the monkey were followed by tameness of an unusual degree. Thus the effect of either amygdalotomy or ablation of the ventro-medial hypothalamic nucleus in the cat was to evoke savagery and a lowered threshold to rage-producing stimuli, while such lesions in the monkey produced the opposite effect.

Dr. Adey pointed out that interconnections between the amygdala and the ventro-medial hypothalamic nucleus had been demonstrated by Le Gros Clark and his co-workers. The pathway was an extensive one through the *stria terminalis*. They had also shown that that hypothalamic nucleus received direct fibres from different portions of the

prefrontal areas and from the tip of the temporal pole, and the ventro-medial hypothalamic nucleus appeared to be a considerably more important funnel for inhibitory cortical influences than the amygdala. Hess, in his classical studies with implanted electrodes in conscious animals, had shown that that area responded to stimulation by a complex syndrome of sympathetic discharge.

Dr. Adey further said that the hippocampus, through its efferent pathway in the fornix, was connected with other closely adjacent areas in the posterior part of the hypothalamus, including the mammillary body. Le Gros Clark and his colleagues had recently shown that the hippocampus had a considerable afferent connexion from the medial pre-frontal cortex through the cingulum bundle. That offered some explanation of Freeman's findings that a medial pre-frontal leucotomy produced better results than the more laterally placed incisions. The hippocampal projection arose in areas 9 and 10 on the medial aspect of the frontal lobe. Cairns's finding that simple removal of the anterior cingulate cortex was not in general followed by diminution in mental symptoms might likewise be explained on the grounds that the ablation did not extend into the underlying cingulum bundle.

Dr. Adey commented that the trend in the surgical treatment of emotional disorders appeared to be towards a limited removal of portions of the temporal lobe rather than towards a blind assault on the frontal areas. It was anticipated that post-operative personality changes would be minimized in that way. Bailey and Gibbs had recently reported the satisfactory treatment of psychomotor epilepsy by temporal lobectomy, and quoted the work of Earl Walker in the use of amygdalotomy for emotional disorders.

Medical Practice.

AMENDMENTS OF THE PHARMACEUTICAL BENEFITS REGULATIONS.

The attention of medical practitioners is drawn to the following amendments of the Pharmaceutical Benefits Regulations.

1. Regulation 29 of the Pharmaceutical Benefits Regulations is amended by omitting sub-regulations (1) and (2) and inserting in their stead the following sub-regulations:

(1) A claim for payment in respect of the supply of pharmaceutical benefits shall be

- (a) made in accordance with a form approved by the Director-General;
- (b) made in respect of prescriptions dispensed during one month only; and
- (c) furnished to the Department of Health at such places as the Director-General specifies.

(2) Except where the Director-General, in special circumstances, otherwise directs, a claim for payment in respect of the supply of pharmaceutical benefits by an approved pharmaceutical chemist, an approved medical practitioner or an approved hospital authority who is the proprietor of a private hospital at which a pharmaceutical chemist is employed, shall be accompanied by

- (a) the originals of the prescriptions, or of the repeat authorizations, upon presentation and surrender of which the pharmaceutical benefits were supplied;
- (b) a tally sheet in accordance with a form approved by the Director-General of prescriptions dispensed during the month in respect of which the claim is made; and
- (c) where a pharmaceutical benefit was supplied in circumstances in which the person obtaining the benefit was required to furnish a statement in accordance with Form F—that statement.

2. (1) The Second Schedule to the Pharmaceutical Benefits Regulations is amended

- (a) by omitting from the definition of "U" the word "and";
- (b) by inserting after that definition the following definition:

"U.S.A." means United States of America;"

(c) by inserting after Item 11A the following Item :						
11B	Benzhexol Hydrochloride	—	2 mg. tab. 5 mg. tab.	100	1 100	1
(d) by inserting after Item 16 the following Item :						
16A	Calcium Para- aminosalicylate	—	100 G. tin 400 G. tin	1	1 1	1
(e) by inserting after Item 17 the following Item :						
17A	Camoquin Hydrochloride	—	0·2 G. tab.	25	—	—
(f) by inserting after Item 26 the following Item :						
26A	Dapsone	—	100 mg. tab.	100	—	—
(g) by inserting after Item 32 the following Item :						
32A	Diasone	—	0·33 G. tab.	200	1	1
(h) by inserting after Item 33 the following Item :						
33A	Diethazine Hydrochloride	—	0·05 G. tab. 0·25 G. tab.	100	1 100	1
(i) by inserting after Item 34 the following Item :						
34A	Digifortis	—	½ gr. tab. 1 gr. tab.	50	1 50	1
(j) by inserting after Item 37 the following Item :						
37A	Dihydrocode- inone Tartrate	—	1/13 gr. tab.	20	—	—
(k) by inserting after Item 40 the following Item :						
40A	Diiodohydroxy- quinoline	—	0·21 G. tab. 0·3 G. tab.	100	1 100	1
(l) by inserting after Item 45 the following Item :						
45A	Diphtheria Prophylactic (Purified Toxoid)	—	1 c.c. amp. 5 c.c. vial 10 c.c. vial	2	1 1 1	—
(m) by inserting after Item 54 the following Items :						
45A	Estopen	—	500,000 U. vial	6	—	—
54B	Ethopropazine Hydrochloride	—	50 mg. tab.	100	1	1
(n) by inserting after Item 65 the following Item :						
65A	Heparin Retard	20,000 U. per 2 mil.	2 mil. amp.	6	—	—
(o) by inserting after Item 87 the following Item :						
87A	Meprochol	3 mg. per c.c.	1 c.c. amp.	6	—	—
(p) by inserting after Item 88 the following Item :						
88A	Mercuramide with Theo- phylline	—	1 c.c. amp. 2 c.c. amp. 5 c.c. amp. 10 c.c. amp.	6	— 6 6 6	—
(q) by inserting after Item 120 the following Items :						
120A	Pernemon	—	2 c.c. amp.	6	1	1
	Crudum	—	10 c.c. amp.	1	1	1
120B	Pernemon Fort	—	1 c.c. amp.	6	1	1
		—	5 c.c. amp.	1	1	1
120C	Pernexin	—	2 c.c. amp.	3	1	1
(r) by inserting after Item 122 the following Item :						
122A	Pethidine Scopolamine Pethidine Hydrochloride 100 mg. Scopolamine 0·43 mg.	—	2 c.c. amp.	6	—	—
(s) by inserting after Item 124 the following Items :						
124A	Phenindamine Tartrate	—	25 mg. tab.	100	1	1
124B	Phenobarbitone	3·1 gr. per 5 c.c.	5 c.c. amp.	6	—	—
		3 gr. per c.c.	1 c.c. amp.	6	—	—
(t) by inserting after Item 125 the following Item :						
125A	Phthalylsul- phacetamide	—	0·5 G. tab.	100	1	1
(u) by inserting after Item 127 the following Item :						
127A	Physostigmine Sulphate	—	1/100 gr. hypo. tab.	20	—	—
(v) by inserting after Item 152 the following Items :						
152A	Stilbamidine Isethionate	—	0·15 G. amp.	10	—	—
152B	Stilboestrol	—	1 mg. amp. 5 mg. amp. 1 mg. tab. 5 mg. tab.	6	— 6 100 100	1 1
(w) by omitting Item 164 and inserting in its stead the following Item :						
164	Solapsone	—	7½ gr. tab.	200	—	—
(x) by inserting after 168 the following Item :						
168A	Testosterone Propionate	25 mg. per c.c. 50 mg. per c.c. 50 mg. per c.c.	1 c.c. amp. 1 c.c. amp. 10 c.c. vial	12	— 12 1	— — —
(y) by inserting after Item 171 the following Item :						
171A	Thiacetazone and	—	25 mg. tab. 50 mg. tab.	100	— 50	— —
(z) in accordance with the Schedule to these Regulations.						
(2) In the Schedule to these Regulations, "words" includes letters, figures and symbols.						
3. (1) The Third Schedule to the Pharmaceutical Benefits Regulations is amended by omitting Table A and inserting in its stead the following table:						
TABLE A.						
Class of Pharmaceutical Benefit.	Type of Container.	Additional Amount.				
Ampoules...	Powder slide.	Size 6—5d.; size 12—6d.; size 24— 6d.				
Hypodermic tablets Sulphonamide tablets.	Vial. Tablet bottle size 100.	2d. 5d.				
Tablets (except as above) and pills.	Tablet bottles.	Size 25—3d.; size 50—4d.; size 100— 5d.				
(2) The amendments effected by this Regulation shall have effect with respect to						
(a) Pharmaceutical benefits supplied on presentation of prescriptions written on or after the first day of September, 1951; and						
(b) Where, in the case of prescriptions written before that date, pharmaceutical benefits are supplied on presentation of those prescriptions for a second or a subsequent time on or after that date—pharmaceutical benefits so supplied.						
4. (1) Notwithstanding the amendments of the Pharmaceutical Benefits Regulations effected by Regulations 1 and 2 of these Regulations, the provisions of the Pharmaceutical Benefits Regulations, as in force immediately before the date of commencement of these Regulations, shall continue to apply in relation to the supply of pharmaceutical benefits upon presentation, whether before or after that date, of prescriptions written before that date.						
(2) Nothing in this Regulation shall be deemed to affect the operation of Sub-regulation (2) of Regulation 3 of these Regulations.						
5. The following pharmaceutical benefits have been declared to come under the provisions of Regulation 14A and may be						

(2) The amendments effected by this Regulation shall have effect with respect to

(a) Pharmaceutical benefits supplied on presentation of prescriptions written on or after the first day of September, 1951; and

(b) Where, in the case of prescriptions written before that date, pharmaceutical benefits are supplied on presentation of those prescriptions for a second or a subsequent time on or after that date—pharmaceutical benefits so supplied.

4. (1) Notwithstanding the amendments of the Pharmaceutical Benefits Regulations effected by Regulations 1 and 2 of these Regulations, the provisions of the Pharmaceutical Benefits Regulations, as in force immediately before the date of commencement of these Regulations, shall continue to apply in relation to the supply of pharmaceutical benefits upon presentation, whether before or after that date, of prescriptions written before that date.

(2) Nothing in this Regulation shall be deemed to affect the operation of Sub-regulation (2) of Regulation 3 of these Regulations.

5. The following pharmaceutical benefits have been declared to come under the provisions of Regulation 14A and may be

prescribed only in connection with the treatment of the disease specified and a prescription for any of these benefits must be endorsed "written in accordance with Regulation 14A".

Item.	Drug.	Disease.
124A	Phenindamine tartrate.	Parkinsonism.
152B	Stilbestrol.	Carcinoma of the prostate.
168A	Testosterone propionate.	Mammary carcinoma.

THE SCHEDULE.

Amendments of Second Schedule to Principal Regulations.

Item No.	Amendments in Columns 3, 4, 5 and 6.			
2	Add	1 in 100	10 c.c. vial	1 | —
22	Omit line 4.	—	Set containing 9 amps. each 1 c.c. toxoid undiluted and 3 amps. of 1 c.c. toxoid diluted	1 | —
45	Add	—	—	—
52	Before line 1 insert	—	0·6 c.c. amp. 1 c.c. amp.	6 | —
72	Omit from Column 5 the figure "20" (wherever occurring). Insert "100". Insert in Column 6, lines 4, 5, 6 and 7, "1".	—	—	—
89	Omit lines 3 and 4.	—	—	—
90	Omit lines 2 and 3.	—	—	—
92	Before line 1 insert	0·6%	½ oz. bottle	1 | —
101	Omit all words, insert	—	1 c.c. amp. 1 hypo. tab.	6 | —
102	Omit lines 2 and 3.	per c.c.	10 c.c. vial	20 | —
116	After line 2 insert	1½ gr. per 5 c.c.	5 c.c. amp.	1 | —
122	After line 4 insert	50 mg. per c.c.	50 c.c. bottle	1 | —
138	Add	0·5 G. per 10 c.c.	10 c.c. amp.	6 | 1
167A	Add	—	10 c.c. vial	3 | 1
169	Omit all words, insert	—	500 U.S.U. U. amp. 1,000 U.S.U. U. amp. 1,500 U.S.U. U. amp. 5,000 U.S.U. U. amp. 10,000 U.S.U. U. amp. 1,500 I.U. (1950) amp. 10,000 I.U. (1950) amp.	6 | 1 6 | 1 6 | 1 6 | 1 6 | 1 6 | 1 6 | 1

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

STOMACH PUMP.¹

[*Sydney Gazette*, February 7, 1827.]

One of these very valuable instruments of late invention called "Milliken's Universal Syringe" has been brought out by Dr. Nisbet of the Grenada and purchased by the Government for the use of the Medical Establishment here. Its uses are various: it removes and destroys poison taken into the stomach, it relieves apoplexy occasioned by ardent spirits (a power which renders it particularly desirable in this Colony), it conveys nourishment into the stomach in cases of obstruction in the passages, it scarifies and cups, relieves the nipples of those who have lost their children and is also used for any [sic] other purposes. (*Hobart Town Gazette*.)

¹ From the originals in the Mitchell Library, Sydney.

[*Sydney Gazette*, September 24, 1827.]

We have been favored with the sight of a stomach pump, the property of Dr. Murray which is the only one that has yet been imported into the Colony and which appears to us to be an apparatus as singular as it has been pronounced useful.

Correspondence.

AN EXAMINATION OF RECENT DEVELOPMENTS IN STUDENT HEALTH SERVICES.

SIR: In THE MEDICAL JOURNAL OF AUSTRALIA for September 29 there appeared an article by Mr. H. C. Giese dealing with the health of students in Australian universities. Mr. Giese expressed the view that all students entering a university should be subjected to a compulsory medical examination, and inferred that in no university was such an examination made.

The Council of the University Women's College in this State, which is within the University of Western Australia, has asked me to draw attention to the fact that all entrants to the college must undergo a complete medical examination before admission to the college. Appropriate forms are sent to applicants; these may be filled in by either the applicant's own doctor or by one chosen by her from a list supplied by the local branch of the British Medical Association.

From Mr. Giese's article it would appear no other university college has adopted this system; the council would be glad if other colleges introduced this very necessary reform, which might eventually lead to its general acceptance by all Australian universities.

Yours, etc.,

ROBERTA H. M. JULL,
Past member of the Women's
College Council.
Perth,
November 2, 1951.

MODERN TRENDS IN RADIOTHERAPY.

SIR: Permit me to comment on Dr. A. G. S. Cooper's article which appeared in THE MEDICAL JOURNAL OF AUSTRALIA of November 3, 1951.

With regard to carcinoma of the lip, Sir Herbert Maitland's teaching was that in all except the very early and very late cases, cervical lymph glands should be removed. It is quite likely that his mortality figures cannot be bettered by modern methods, but plastic surgery produces, in some cases, better cosmetic results. In a paper published in 1937 (Meyers, 1937), seven cases of epithelioma of the lip were reported. In all these the glands had not been operated on, but were subsequently involved. These cases occurred over a relatively short period of time. Dr. Cooper states that "In Queensland the frequency of metastases in cases of epithelioma of the lip is approximately 5%". In Regaud's Clinic 20% of the cases without the palpable glands subsequently showed involvement of the glands. I do not know what the present rate of recurrence is in this clinic. It is possible that in Queensland, as a result of the various cancer campaigns, there are many more cases coming much earlier for treatment than heretofore. We must, however, produce very much better statistics than exist at present. It is not sufficient to estimate these results over a five-year period, but over at least a ten-year period. We do not know what the follow-up of the Queensland figures would reveal after a period of ten years, but it is essential that they should be produced. Surely the use of routine methods is not very scientific. Why not remove the glands in every other case to the level of the omohyoid (an operation of this kind is not mutilating) and then compare results after ten years? This method has given much information as used in Sydney for cancer of the uterus. Even with the figure at 5% recurrence, it should be necessary to tell patients that out of every 100, five will certainly get recurrence.

With regard to cancer of the tongue, in patients with no previous glandular involvement it was the custom to treat these people with distance radium in some cases for the second involvement. One would like to know the effect of this treatment and whether the practice is used overseas.

One would also need to compare the results of treatment of the glands in these cases, with surgery and radiation. It is well to remember, however, that metastases may be very rapid, as revealed by the following case. The patient was referred to me by a dentist for an opinion. There was a carcinoma of the tongue about one centimetre from the last molar tooth. About six weeks previously advice was sought at the Radium Institute. Some misunderstanding occurred as to whether the tooth should be extracted before the use of radium. Some six weeks went by, and the patient consulted a dentist. By this time a large gland had developed in the draining area of the primary growth.

With regard to cancer of the breast, treatment of cancer in this region is very unsatisfactory, but we need much more evidence of the results of treatment as advocated by Dr. McWhirter. According to Dr. Cooper this method has been used apparently since 1948. The idea, however, was mentioned much earlier, as in a personally treated case (microscopically proved to be cancer) I treated the patient along the lines suggested. Radiation treatment was applied to the primary area and to the region of the draining glands. This patient remained well for about six years, but eventually died some nine years after treatment was commenced.

Yours, etc.,

E. S. MEYERS.

The University of Queensland Medical School,
Herston Road,
Brisbane, N.I.
November 9, 1951.

Reference.

Meyers, E. S. (1937), "Epithelioma of the Lip, Glandular Involvement and the 'Wait-and-See' Method", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 399.

Post-Graduate Work.

INTERCOMMONWEALTH POST-GRADUATE SCHOLARSHIPS IN SCIENCE.

THE Royal Society Empire Scientific Conference and the British Commonwealth Scientific Official Conference in 1946 recommended the preparation of a list of post-graduate scholarships available for scientific study within the Commonwealth. The task of compiling the list was assigned to the British Commonwealth of Nations Scientific Liaison Office in London. When B.C.S.O. (London) opened in 1948 consideration was given to implementation of the recommendation. Thanks to the generous cooperation of universities, institutions and government departments throughout the Commonwealth, the publication "Inter-Commonwealth Post-Graduate Scholarships in Science" has now been completed.

Since the main objective of the list is to encourage the movement of scientists within the Commonwealth, only those awards open to members of at least one Commonwealth country or colony other than the awarding one have been included. The entries are set out in tabular form showing, in addition to the names of the scholarships and the agencies awarding them, details of the fields of study, where tenable, duration and value, closing dates for applications and addresses to which these should be sent. There are more than 350 separate entries in the list; many of these cover a number of scholarships, so that the total number of available awards is much greater. The list is therefore a valuable work of reference for students and educational authorities.

The list is published on behalf of B.C.S.O. (London) by His Majesty's Stationery Office. The price (6s. 3d. Australian) has been fixed at the lowest possible level having regard to present publishing costs in an endeavour to bring the document within the reach of university students throughout the Commonwealth. It is on sale in the United Kingdom at all branches of His Majesty's Stationery Office, and in Australia it may be obtained through their agents, whose names and addresses are listed as follows: Angus and Robertson, Limited, 89 Castlereagh Street, Sydney; McGill's News Agency, 183-185 Elizabeth Street, Melbourne; Oldham, Beddoe and Meredith (1932) Proprietary, Limited, 36 Elizabeth Street, Hobart; The Grahame Book Company, Prudential Building, Martin Place, Sydney.

Obituary.

ARTHUR NORMAN MCARTHUR.

We are indebted to Dr. G. A. McArthur for the following appreciation of the late Dr. Arthur Norman McArthur.

Dr. A. Norman McArthur (known to everyone as "Potts"), who died on December 11, 1950, aged eighty years, was the fifth son of Peter McArthur, pioneer pastoralist of the southwestern district of Victoria, who, leaving Scotland at the age of nineteen years, landed in Melbourne when the town boasted some 40 houses and Geelong but two. Norman was born on his father's station, "Meningoort", near Camperdown, on July 14, 1869. He inherited much of his father's vigorous character and personality, and all his life had a love of the country and all outdoor recreations.

He was educated at Geelong College and passed thence to the University of Melbourne, being in residence at Ormond College. Deciding to finish his medical course in London, he became a member of the Royal College of Surgeons and a licentiate of the Royal College of Physicians in 1895. After doing some post-graduate work in England, he went to Tasmania, and in 1898-1899 was house surgeon at Launceston General Hospital; the medical superintendent at that time was John (later Sir John) Ramsay. Returning to England, McArthur married Mellicent, daughter of Wickham Noakes, of Selston Park, Surrey. Bringing his bride to Melbourne, he commenced practice in Collins Street as an obstetrician and gynaecologist. In 1903 he took the degrees of bachelor of medicine and bachelor of surgery in the University of Melbourne. In the same year he was appointed honorary obstetric and out-patient surgeon to the Women's Hospital. In 1905 he was appointed honorary specialist for diseases of women at Saint Vincent's Hospital. Next year he was appointed honorary gynaecologist to in-patients. A few years later he was appointed senior honorary gynaecologist. Thereupon he resigned his appointment at the Women's Hospital and ceased practising obstetrics.

In 1916 McArthur was elected to the Council of the Victorian Branch of the British Medical Association. Soon he was involved in a fight with the lodges. The Council was determined to obtain better conditions for the men returning from the war. The lodges were stubborn, and the strike weapon was freely advocated in the Council. To this McArthur was strongly opposed, and finally better conditions were satisfactorily obtained through perseverance in negotiation.

McArthur evolved some special operative techniques of his own. One of these was demonstrated to Dr. William Mayo (Rochester, United States of America) when he visited here in 1924. This resulted in McArthur's election as an honorary Fellow of the American College of Surgeons. He was a foundation Fellow of the Royal Australasian College of Surgeons.

On the termination of his appointment at Saint Vincent's Hospital, he organized a fund which raised £6000 to buy radium for the hospital, and he joined a campaign under the chairmanship of the late Dr. B. T. Zwar to organize cancer clinics.

He was a regular contributor to THE MEDICAL JOURNAL OF AUSTRALIA on subjects connected with his speciality, and an enthusiastic member of the various sessions of the Australasian Medical Congress and of annual meetings of the Royal Australasian College of Surgeons. For one of the latter he visited New Zealand and was asked to demonstrate one of his operations at Dunedin and Auckland, and he also showed a film of the operation at the University of Otago.

McArthur's sporting activities were rather unique in their versatility. At the University of Melbourne he won a double blue for cricket and football. In London he was runner-up in the interhospital boxing championship in the heavyweight class, and on his return he was for many years chairman of the Victorian amateur boxing and wrestling championships. In England he also followed the hounds when occasion offered, and he was always willing to drive a coach and four to or from a race meeting. He played polo from an early age and with his three elder brothers was a member of the McArthur Brothers polo team. On settling in Melbourne he played with the Melbourne Polo Club for seven years, being captain for four years. He played royal tennis regularly at the club's court in Spring Street, until struck on the right eye by a ball. This caused a detachment of the retina, and thereafter he had no useful vision in this eye. This did not worry him in the least. He quickly adjusted himself to the new conditions, and his operative technique was as good as ever. The only change he allowed it to make was the abandoning of royal for lawn tennis. But of all

pastimes field shooting was his favourite. The openings of the quail and duck seasons were sacred—no professional work then—and he had numerous friends all over Victoria ready to tell him where the best shooting was to be had. During the close seasons he kept his eye in by some trap shooting at the Hawthorn Sparrow and Starling Club. For many years he was chairman of the Game Preservation Society of Victoria and also chairman of the Advisory Council of Fauna and Flora of Victoria. He was a member of the Melbourne and University Clubs and of the Victoria Racing Club.

He acquired about 300 acres of scrubland at Upper Beaconsfield. Here he and his cronies spent many happy week-ends building a house. Some of the land he cleared and planted with apple trees, for at this time there was a very profitable market for apples in Europe through the port of Hamburg. Just as the trees were coming into bearing, the first World War broke out, and his dreams of wealth from this source vanished. The local market proved a more difficult proposition, but for many years "The Farm" made a happy week-end in the country for himself and a holiday home for his children.

He was an enthusiastic supporter of his old school. When Geelong College became one of the Public Schools of Victoria in 1908, he was appointed to the school council and retained this office till his death. He was always a competitor in the "old boys" race at the school sports, and it was a proud day for him when he became qualified to run in the "veterans" race.

His latter years saw him become increasingly crippled with osteoarthritis of the hips, and his heart was also affected, but he made light of his infirmities. He was a delightful jester and leg-puller. His greeting to a friend was always with some quip, but his shafts never had any barb. He had an unending fund of interesting reminiscences, with which to entertain a shooting party over a week-end or on a long train or motor journey.

His end came suddenly and peacefully. He had one final jest. In his will it was found that he had left a sum of money so that his friends could hold a "wake". They gathered on the way back from his funeral and drank to "good shooting in the next world".

He is survived by his widow, by his son Peter, who in the last war saw service in the Middle East as captain in the Ninth Australian Division Cavalry Regiment, and by three married daughters.

Charles Ferguson, Esq., C.M.G., M.C., Hobart, writes: During the two years that Norman McArthur was house surgeon at the Launceston Hospital, he was the life and soul of the group of young men in our community. He was a fine boxer, and while a student in London was in the final bout in the heavyweight class in the London hospitals' competition. Early in the fight his right arm was disabled, but he saw out the distance using his left only; however, he did not win. He set up a gymnasium for us and taught us all the manly art of self-defence. I recall two amusing stories of his experiences while doing hospital work in the East End of London. Returning from seeing a patient, he was attacked by a "tough", who was promptly knocked out by Norman's straight left. Thereupon the "tough" was picked up, dusted, taken to the nearest hostelry for a reviver, had his tale of woe listened to for an hour and then finally was sent on his way (probably with a few "bob" in his palm) compensation for the effects of the straight left. On another occasion Norman was returning to his hospital, having been at a race meeting somewhere and rather dressed-up in a top hat, stick and gloves. Again he was set on, with the same disastrous consequence to his attacker, but in the fracas his hat, stick and gloves (all of pawnable value) had disappeared in the crowd, which had quickly collected. But the moral effect of the "straight left" was very great. "Ere, where's the gent's 'at? Parse it along. Quick now. Doant keep 'im wyetin. An' 'is stick. An' 'is gloves. That's it. Ere yer are, sir! Ere's yer things. My word, sir! Yer did flatten 'im proper, sir!" Norman coached the northern Tasmanian eight oar crew for two years in its annual race against the southern crew. His popularity with the crew reached a climax when he took them for an outing in a four-in-hand turnout in Hobart. He was a member of the amateur dramatic society known as "The Muffs", which was a very capable organization, with quite a repertoire, and was near professional standard, as it was run by two ex-professionals. He also taught some of us the rudiments of polo and did some quail shooting with

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED OCTOBER 27, 1951.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1(1)	..	1	..	2
Amoebiasis	1	..	..	..	3
Ancylostomiasis	1	..	..	..	2	..	1
Anthrax	1	..	..	..	..
Bilharziasis
Brucellosis
Cholera
Chorea (St. Vitus)
Dengue
Diarrhoea (Infantile)
Diphtheria	14(12)	4(4)	6(6)	1(1)	9(8)	1(1)	41	..	47
Dysentery (Bacillary)	1	..	..	..	..	..	30
Encephalitis	1
Filariasis
Homologous Serum Jaundice
Hydatid
Infective Hepatitis
Lead Poisoning
Leprosy
Leptospirosis
Malaria
Meningococcal Infection	5(3)	3(1)	..	..	1	..	..	..	9
Ophthalmia
Ornithosis
Paratyphoid
Plague
Poliomyelitis	8(5)	4(3)	1	35(24)	1	..	..	..	49
Puerperal Fever	1	..	..	..	..	..	1
Rubella	..	7(2)	..	..	..	7(3)	..	..	14
Salmonella Infection	1(1)	..	..	1
Scarlet Fever	14(11)	7(5)	7(4)	6(3)	2(2)	..	..	..	36
Smallpox
Tetanus
Trachoma
Trichinosis
Tuberculosis	..	17(12)	30(22)	20(15)	4(3)	15(11)	2	4	92
Typhoid Fever
Typhus (Flea-, Mite- and Tick-borne)
Typhus (Louse-borne)
Yellow Fever

¹ Figures in parentheses are those for the metropolitan area.

my father. He was, in short, an active and popular member of this little community and was much missed by us all when he left to go into practice in Melbourne.

Leslie Smith, Esq., writes: "Potts" and I shot all over Victoria from the Gippsland Lakes to Naracoorte, and no one could wish for a better companion. He loved his dogs, and nothing gave him greater pleasure than seeing a good dog at work during a quail shoot. We had many amusing incidents, which would take too long to relate, but I remember once at the opening of a duck season, we were in a reed bed on the edge of a swamp at Kerang. An old swan came flapping over like a floating blanket, and some trigger-happy pseudo-sport shot it. "Shame! Shame!", called "Potts" in a voice that echoed far in the still morning, and an astonished voice arose from the pseudo-sport: "Good heavens! There's a bloody parson in the swamp." Mostly he shot over friends' territory, but when outside this he was always meticulous in obtaining permission from the owner. Sometimes he met with hostility, but this generally vanished after a few minutes' "blarney" from "Potts" and usually ended in his being given permission to shoot "anywhere south of the equator".

Dr. D. Murray Morton writes: The foregoing outline of the professional and personal career of the late Norman McArthur will be appreciated by his surviving contemporaries and his old students now in practice. It serves to recall many pleasant memories of a personality held in universal and affectionate esteem. I recall my personal pleasure and satisfaction when I was told by the then mother rectoress of Saint Vincent's Hospital that he had been appointed to the honorary staff of the hospital. He gave long and sound service to the hospital as honorary gynaecologist, and at staff dinners his accomplishments as an after-dinner speaker always gave life to the gathering from his innate sense of humour definitely coloured by his ancestry. His wide interests outside the scope of his profession indicate that he was a man of exceptionally wide accomplishments. In his professional as well as in his sporting activities, "Potts" McArthur always "played the game".

GEOFFREY JOHN LEES.

We regret to announce the death of Dr. Geoffrey John Lees, which occurred on November 9, 1951, at Wollongong, New South Wales.

Corrigendum.

In the issue of November 17, 1951, at page 676, a review was published of "Encyclopedia of the Eye: Diagnosis and Treatment", by Conrad Berens and Edward Siegel, under the title "Ophthalmic Diagnosis and Treatment". By an unfortunate oversight, the name of Angus and Robertson, Limited, Sydney, by whom the book was sent for review, was omitted from the footnote. We regret this omission.

Medical Appointments.

Dr. L. Jones has been appointed senior medical officer, Division of Mental Hygiene, Department of Public Health, New South Wales.

Dr. D. Ross has been appointed deputy medical superintendent, Division of Mental Hygiene, Department of Public Health, New South Wales.

Dr. J. K. Wilson has been appointed senior medical officer, Division of Mental Hygiene, Department of Public Health, New South Wales.

Dr. H. McI. Birch has been appointed Deputy Director-General of Medical Services for South Australia.

Nominations and Elections.

THE undermentioned have been elected as members of the New South Wales Branch of the British Medical Association: Bassil, John Vincent Carlin, M.B., B.S., 1951 (Univ. Sydney), 38 Pearl Bay Avenue, Mosman. Duggan, John Malcolm, M.B., B.S., 1951 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst. Dunlop, William Richard, M.B., B.S., 1951 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Egan, James Edward, M.B., B.S., 1947 (Univ. Sydney), Wellington Road, Chester Hill. Garner, Ralph Lindsay, M.B., B.S., 1951 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst. Kinny, Noel Wesley, M.B., B.S., 1951 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown. Lane, Margery Ritchie, M.B., B.S., 1951 (Univ. Sydney), "Claverton", Alma Street, Pymble.

Diary for the Month.

Nov. 27.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 28.—Victorian Branch, B.M.A.: Council Meeting.
Nov. 29.—New South Wales Branch, B.M.A.: Branch Meeting.
Nov. 29.—South Australian Branch, B.M.A.: Branch Meeting.
DEC. 4.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
DEC. 4.—New South Wales Branch, B.M.A.: Organization and Science Committee.
DEC. 5.—Victorian Branch, B.M.A.: Annual Meeting.
DEC. 5.—Western Australian Branch, B.M.A.: Council Meeting.
DEC. 6.—New South Wales Branch, B.M.A.: Clinical Meeting.
DEC. 6.—South Australian Branch, B.M.A.: Council Meeting.
DEC. 11.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.I.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

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